

WORLD'S COLUMBIAN EXPOSITION, CHICAGO, 1893.



RUSSIA

MINISTRY OF WAYS OF COMMUNICATION

STATISTICAL SECTION.

STATISTICAL SURVEY

OF RAILWAYS AND INTERNAL WATER WAYS.

Appended to this survey is a List of the publications of the Statistical Section of the Ministry of Ways of Communication, presented at the Universal Exhibition at Chicago, 1893.

St. PETERSBURG
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LIST

of the publications of the Statistical Section of the Ministry of Ways of Communication, presented at the World's Columbian Exposition at Chicago, 1893.

I. Statistical publications.

1. Statistical Review of the railways and internal water ways.
2. Statistical Summary of the Ministry of Ways of Communication, the last parts containing mainly information from the year 1876, i. e., since the Philadelphia Exhibition:
 - a. general information upon railways, parts XVII, XX, XXIII, XXVII, XXX, and XXXIII.
 - b. general information upon internal water ways and roads, parts XVIII, XXII, XXV, XXVIII and XXXI.
 - c. information upon the traffic of the principal kinds of goods and upon the total goods traffic over the railways and internal water ways, parts XIX, XXI, XXIV, XXVI, XXIX and XXXII.
3. Supplement to the Statistical Summary of the Ministry of Ways of Communication.
 - a. Parts I and II: information upon the export and import of grain through railway stations, wharves and customhouses, arranged according to the governments of European Russia.
 - b. Parts III and IV: information upon the export and import through railway stations, wharves and customhouses, of grain, salt, coal, petroleum, kerosene and other petroleum products, arranged according to the governments of European Russia.
 - c. Part V: information upon the conveyance by railways and internal water ways (despatch from the governments of European Russia in connexion with arrival in chief ports of concentration) of wheat, wheat flour, oats and barley.
 - d. Part VI: information upon the conveyance of grain by railways and internal water ways and cartage (only to the points for export abroad) in European Russia, in connection with the harvest, prices, and foreign export.
4. Enumeration of the internal water ways of European Russia.
5. List of the river steam craft of European Russia.
6. List of the river craft of European Russia other than steam vessels.

II. Cartographical Publications.

7. Map of the railways, roads and internal water ways of Russia, on a scale of 60 versts to the inch: edition 1893.
 8. Key map of the railways, roads and internal water ways, indicating the length of these ways and the ownership of the railways; appendix to 60-verst map, edition 1893.
 9. Graphical representation of the opening and closing of the rivers, seas and canals of European⁵Russia and of the duration of the navigation season and of the spring and autumn ice drifts during 10 years (1882 — 1891); appendix to Part XXXI of the Statistical Summary of the Ministry of Ways of Communication.
 10. Graphical representation of the traffic of vessels and rafts on the artificial water ways of European Russia; appendix to Part XXVIII of the Statistical Summary of the Ministry of Ways of Communication.
 11. Graphical representation of the traffic on the railways and internal water ways of European Russia; appendix to Part XXIX of the Statistical Summary of the Ministry of Ways of Communication:
 - a. of all ordinary and chief goods
 - b. of principal kinds of breadstuffs.
 12. Graphical representation of the conveyance of breadstuffs over the railroads and internal water ways and by cartage (only to the points of export abroad) in European Russia, in connexion with the harvest, prices, and foreign export; appendix to Part VI of the Supplement to the Statistical Summary of the Ministry of Ways of Communication:
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PREFACE.

THE present statistical survey of the railways and internal water ways of Russia, compiled for the World's Columbian Exposition at Chicago, 1893, includes the principal data upon the condition and activity of the said ways of communication. It is founded upon official information, printed in the Statistical Summary of the Ministry of Ways of Communication, the last parts of which, referred to in the list of publications quoted above, are also presented at the World's Columbian Exposition.

To increase the usefulness of the statistics in the present survey, expressed in Russian measures, the American equivalents of the latter are given below:

1 verst = $1,166\frac{2}{3}$ yards = 0.6629 Eng. mile.

1 sagene = $2\frac{1}{3}$ yard = 7 Eng. feet.

1 arshine = $\frac{7}{9}$ yard = $2\frac{1}{3}$ Eng. feet.

1 chetvert-arshin (quarter arshine) = $\frac{7}{12}$ Eng. foot.

1 poud = 36.1127 Eng. pounds.

1000 pouds = 36,113 Eng. pounds = 16.1218 tons.

1000 poud-versts = 10.68714 ton-miles.

1 gold rouble = 77.185 cents.

1 paper rouble (at Exchange 150 paper R. = 100 gold R.) = 51.46 cents.

1 paper kopeck per poud and verst = 48.15 cents per ton and mile.

The present statistical survey was compiled, as far as regards railways, by Mr. G. G. Yershov; and as far as regards internal water ways, by Mr. V. K. Tomashevsky, under the general superintendence of the Head of the Statistical Section, Mr. I. F. Borokovsky.

The English translation of the Statistical Survey was made under the editorship of the Consul-General for the United States of North America, Dr. J. M. Crawford.

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RAILWAYS.

Length of railways.

On the 1st of January, 1893 there were 30,983 versts of railways open to general traffic in Russia of which there were in:

European Russia, exclusive of Finland, . . .	27,814 versts
The Grand Duchy of Finland	1,826 „
Asiatic Russia (Transcaspian Railway) . . .	1,343 „

These lines are distributed according to management and ownership in the following manner:

On the 1st of January, 1893, there were:

	Under State manage- ment.		Under private manage- ment.	
	State rys.	Priv. rys.	Priv. rys.	State rys.
Railways in European Russia,				
without Finland	10,327 v.	16 v. ¹	16,768 v.	703 v. ²
Finland	1,795 „	—	31 „ ³	—
Asiatic Russia	1,343 „	—	—	—
Total	13,465 v.	16 v.	16,799 v.	703 v.
	13,481 versts.		17,502 versts.	

The development of the railway system of European Russia.

The railway system of Russia, excepting Finland, from the date of the completion of the construction of the first road namely, that between St. Petersburg and Tsarskoe Selo in 1838, over a distance of 25 versts, has shewn the following annual progress:

In 1838 were opened	25 versts.	In 1841 were opened	— versts.
„ 1839 „ „	— „	„ 1842 „ „	— „
„ 1840 „ „	— „	„ 1843 „ „	— „

1. The Koriukov branch of the Libau-Romny railway.

2. The harbour branch (31 v.) of the Nicholas Railway, the Dzhankoi-Feodosia (111 v.) of the Lozovo-Sevastopol Railway, the Rzhev-Viazma (116 v.) of the Novotorzhsk Railway, the Riga-Bolderaa (17 v.) of the Riga-Dvinsk Railway, and the Kozlov-Saratov (428 v.) of the Riazan-Ural Railway.

3. Borgo-Kervo.

In 1844 were opened	— versts.	In 1869 were opened	1,192 versts.
" 1845	110	" 1870	2,445
" 1846	126	" 1871	2,631
" 1847	83	" 1872	508
" 1848	13	" 1873	1,958
" 1849	—	" 1874	1,745
" 1850	111	" 1875	786
" 1851	469	" 1876	521
" 1852	—	" 1877	1,055
" 1853	42	" 1878	1,179
" 1854	—	" 1879	628
" 1855	—	" 1880	125
" 1856	—	" 1881	36
" 1857	113	" 1882	331
" 1858	—	" 1883	622
" 1859	159	" 1884	824
" 1860	240	" 1885	1,002
" 1861	463	" 1886	467
" 1862	1,117	" 1887	859
" 1863	197	" 1888	766
" 1864	90	" 1889	421
" 1865	219	" 1890	684
" 1866	670	" 1891	123
" 1867	443	" 1892	453
" 1868	1,763		
			Total. 27,814 versts.

The first section of the railways of the Grand Duchy of Finland, Helsingfors-Tavastehus, was opened for general traffic in 1862. The first section of the Transcaspian Railway, Mikhailov Bay to Kizil-Arvat, was opened in 1880—81.

Dividing the above mentioned period 1838 to 1893 into quinquennial periods, of which there will be eleven, and ascertaining the number of versts of railway built during each, the result for European Russia, without Finland, would be as follows:

During 1838—1842 were built	25 versts.
" 1843—1847 " "	319 "
" 1848—1852 " "	593 "
" 1853—1857 " "	155 "
" 1858—1862 " "	1,979 "
" 1863—1867 " "	1,619 "
" 1868—1872 " "	8,539 "
" 1873—1877 " "	6,065 "
" 1878—1882 " "	2,299 "
" 1883—1887 " "	3,774 "
" 1888—1892 " "	2,447 "

Total . . . 27,814 versts.

These data shew: 1. That an extensive construction of railways in Russia began in the fifth quinquennial period (1858—1862); 2. That more than half of the whole system in European Russia was built in the seventh and eighth quinquennial periods (1868—1877, and 14,604 versts). There is one verst of these railways, whose total verstage is 27,814, to every 175 square versts of country and to 3,708 inhabitants of both sexes in European Russia without Finland.

On the 1st of January, 1891, that is, at the end of the period for which information upon the railways of European Russia without Finland is given below, the length of these railways was 27,238 versts.

The rolling stock.

Upon the railway system on the 1st of January, 1891, the rolling stock consisted of:

	Total.	Per verst.
Locomotives	6,933	0·25
Cars:		
a. Passenger	7,759	0·28
Axles	22,998	0·84
b. Goods and luggage	145,611	5·34
Axles	294,728	10·82
Postal cars.	239	0·01

It hence appears that there were on an average to every passenger car 2·96 axles, to every goods car, 2·02 axles.

The carrying capacity of the cars appears from the following figures:

	Total.	Per car.	Per axle.
Seats in passenger cars.	284,892	36·72	12·43
Carrying capacity of cars in pounds	90,605,037	622	307

Capital invested in Railways.

The capital sunk in the building of the system of railways, State and private, open for general traffic on the 1st of January, 1891, together with the losses incurred in the realization of stock, appears from the following figures:

On the 1st of January, 1891:

1. The amount of stock, original and additional, was nominally:	Gold roubles.	Paper roubles.
a. Shares	242,554,000	135,846,000
b. Bonds	1,329,200,000	92,007,000
Or a total of	1,571,754,000	227,853,000
2. Building loans, not included in stock capital.	49,791,000	264,214,000
3. Expenditure, thrown upon the income from traffic	—	19,211,000

4. Expenditure out of the reserve, repairing and other, capital of the railways.	Gold roubles. —	Paper roubles. 56,928,000
Total	1,621,545,000	568,206,000

Or deducting sums omitted to be paid by the Government to the railway companies in respect to consolidated bonds

1,617,906,000 568,206,000

After reduction of paper roubles to metallic, at exchange 1 R. gold = 1.40 roubles paper¹, the total expenditure upon the construction of the railways amounts to 2,024,000,000 gold roubles.

This makes an expenditure of 72 thousand gold roubles per verst.

Of this sum there falls to the share of the government:

1. Capital, with Government guarantee of the interest and amortization:	Gold roubles.	Paper roubles.
a. Shares	215,817,000	91,016,000
b. Bonds	351,287,000	52,332,000
2. Bonds, retained by government (consolidated).	922,129,000	34,582,000
3. Government building loans	49,791,000	264,214,000
4. Government subsidies not repayable.	—	12,532,000
Total . .	1,539,024,000	454,676,000

In gold roubles 1,864,000,000

The remaining 160 million gold roubles represent expenditure in shares and bonds without Government guarantee, and out of the means of private railway companies.

Consequently the participation of the Government in the construction of the railway system, in one way or another, amounts to 92 per cent of the total expenditure upon these railways.

The annual amount of the Government guarantee and expenditure in respect of consolidated bonds is as follows:

	Gold roubles.	Paper roubles.
Upon guaranteed shares and bonds . .	25,400,000	6,649,000
„ consolidated bonds	36,600,000	8,368,000 ²
Total	62,000,000	15,017,000

The debts of railway companies.

The debts of railway companies to the Government on January 1, 1891, in respect to guarantee (additional payment by Government) and

1. The average rate of exchange for 1890, assumed by the State Control.

2. Including 7,200,000 paper roubles upon a capital of 144,437,500 gold roubles, part of 922,129,000 roubles.

consolidated bonds (sum owing to Government), with interest upon debts for past years and fines, appear from the following figures:

	Gold roubles.	Paper roubles.
Guarantee	12,486,000	337,590,000
Consolidated bonds	284,980,000	14,081,000
Total	297,466,000	351,671,000
Over and above this, the railways were on the 1st of January, 1891, indebted to the Government on loans for building and working purposes, with interest,		
	11,915,000	215,757,000
The total debt of the railway companies to the Government on the 1st January, 1891, amounted to		
	309,381,000	567,428,000

Financial Results of the Railway System.

The chief financial results of the working of the railway system for the decade 1881—1890 appear from the following figures:

	Gross income: Thous. roubles.	Working expenses: Thous. roubles.	Net income: Thous. roubles.
In 1881	200,840	145,126	55,714
" 1882	215,163	144,772	70,391
" 1883	231,875	147,437	84,438
" 1884	229,766	143,490	86,276
" 1885	234,375	141,330	93,045
" 1886	225,217	141,358	83,859
" 1887	252,987	144,264	108,723
" 1888	283,383	160,058	123,325
" 1889	282,691	168,833	113,858
" 1890	284,531	171,774	112,757
Average for 1881—1890 .	244,083	150,844	93,239

Reducing these figures to one verst of the mean length of the railway system for the year, the following is the result obtained:

	Gross income.	Working expenses.	Net income.
In 1881.	9,460 roubles.	6.836 roubles.	2,624 roubles.
" 1882.	10,092 "	6,790 "	3,302 "
" 1883.	10,587 "	6,732 "	3,855 "
" 1884.	10,209 "	6,375 "	3,834 "

	Gross income.	Working expenses.	Net income.
In 1885.	9,959 roubles.	6,005 roubles.	3,954 roubles.
" 1886.	9,270 "	5,818 "	3,452 "
" 1887.	10,209 "	5,822 "	4,387 "
" 1888.	11,081 "	6,259 "	4,822 "
" 1889.	10,743 "	6,416 "	4,327 "
" 1890.	10,665 "	6,439 "	4,226 "
Average for 1881—1890.	10,227 "	6,349 "	3,878 "

It appears from the *verst* averages that the traffic results of the railways were the best in 1888, and that on the whole the chief financial results of the traffic for the last years of the decade are considerably superior to those of the first years of the same period.

The chief financial results of the traffic in terms of train-*versts* are as follows:

	Gross income.	Working expenses.	Nett income.
In 1881	2·15 roubles	1·55 roubles	— · 60 roubles
" 1882	2·22 "	1·49 "	— · 73 "
" 1883	2·26 "	1·44 "	— · 82 "
" 1884	2·26 "	1·41 "	— · 85 "
" 1885	2·27 "	1·37 "	— · 90 "
" 1886	2·23 "	1·40 "	— · 83 "
" 1887	2·29 "	1·31 "	— · 98 "
" 1888	2·35 "	1·33 "	1 · 02 "
" 1889	2·31 "	1·38 "	— · 93 "
" 1890	2·29 "	1·38 "	— · 91 "
Average for 1881—90.	2·28 "	1·41 "	— · 87 "

The chief financial results of the traffic in terms of car axle-*versts* are as follows:

	Gross income.	Working expenses.	Net income.
In 1881	4·64 kopecks	3·35 kopecks	1·29 kopecks
" 1882	4·65 "	3·13 "	1·52 "
" 1883	4·52 "	2·88 "	1·64 "
" 1884	4·43 "	2·77 "	1·66 "
" 1885	4·44 "	2·68 "	1·67 "
" 1886	4·37 "	2·74 "	1·63 "
" 1887	4·28 "	2·44 "	1·84 "
" 1888	4·33 "	2·45 "	1·88 "
" 1889	4·26 "	2·55 "	1·71 "
" 1890	4·20 "	2·54 "	1·66 "
Average for 1881—1890	4·41 "	2·75 "	1·66 "

The working expenses expressed as a percentage of the gross income is:

In 1881	72 per cent.	In 1885	60 per cent.	In 1889	60 per cent.
" 1882	67 " "	" 1886	63 " "	" 1890	60 " "
" 1883	64 " "	" 1887	57 " "	Av. 1881—90	61 " "
" 1884	62 " "	" 1888	56 " "		

It appears from these data that the relation in question changed from year to year as follows: in 1881 the working expenses of the whole system consumed 72 per cent of the income; then, from 1882 begins a gradual improvement, which in 1885 was expressed by 60 per cent of the gross income; in 1886, 63 per cent of the gross income went to expenses; in 1887, 57 per cent, in 1888 the proportion is most favourable, forming 56 per cent, while in 1889 and 1890 it again forms 60 per cent.

An examination of the gross income in respect to different freights for 1881—1890 leads to the following results:

a. Earned by passenger traffic:

	Total.	Per verst.	Percentage of gross income.
In 1881	42,984,000 roubles.	2,025 roubles.	22
" 1882	45,240,000 "	2,122 "	21
" 1883	45,846,000 "	2,093 "	19
" 1884	45,202,000 "	2,008 "	19
" 1885	44,341,000 "	1,884 "	19
" 1886	43,895,000 "	1,807 "	20
" 1887	44,096,000 "	1,779 "	18
" 1888	47,289,000 "	1,849 "	17
" 1889	49,098,000 "	1,866 "	17
" 1890	50,053,000 "	1,876 "	18
Average for 1881—90	45,804,000 "	1,931 "	19

b. Earned by goods traffic:

	Total.	Per verst.	Percentage of gross income.
In 1881	151,306,000 roubles.	7,126 roubles.	75
" 1882	164,635,000 "	7,721 "	77
" 1883	180,298,000 "	8,232 "	78
" 1884	178,619,000 "	7,936 "	78
" 1885	190,034,000 "	8,075 "	78
" 1886	175,900,000 "	7,240 "	78
" 1887	203,322,000 "	8,205 "	80
" 1888	226,271,000 "	8,847 "	80
" 1889	222,137,000 "	8,441 "	79
" 1890	223,313,000 "	8,370 "	78
Average for 1881—90	191,584,000 "	8,019 "	78

It thus appears that the goods traffic gives 75 to 80 per cent, on an average 78 per cent, while the passenger traffic gives 17 to 22 per cent, on an average 19 per cent, of the total gross income; the remaining part of the gross income, about 3 per cent, is assigned to items not connected with the traffic.

The percentages point to a continual increase of the gross income from goods traffic and to a diminution of the same upon passenger traffic, with the exception of the two last years 1889 and 1890, which exhibit the opposite phenomenon.

In terms of units of traffic the following results are obtained:

a. From the conveyance of passengers, excluding the income from various items connected therewith, there was received:

	Per passenger ¹	Per passenger-verst ²
In 1881	123·64 kopecks	1·22 kopecks
" 1882	120·56 "	1·21 "
" 1883	120·80 "	1·18 "
" 1884	118·49 "	1·19 "
" 1885	116·77 "	1·19 "
" 1886	114·72 "	1·18 "
" 1887	114·41 "	1·17 "
" 1888	114·46 "	1·15 "
" 1889	113·50 "	1·16 "
" 1890	111·80 "	1·13 "
Average for 1881—90	116·70 "	1·18 "

These data shew that the receipts both per passenger and per passenger-verst are diminishing, and were least in 1890.

b. From the conveyance of all goods, excepting income from various items connected with the same, there was received:

	Per passenger.	Per poud-verst.
In 1881	5·50 kopecks	0·0280 kopecks
" 1882	5·60 "	0·0280 "
" 1883	5·55 "	0·0273 "
" 1884	5·54 "	0·0267 "
" 1885	5·41 "	0·0266 "
" 1886	5·16 "	0·0264 "
" 1887	5·20 "	0·0253 "
" 1888	5·28 "	0·0246 "
" 1889	4·94 "	0·0236 "
" 1890	4·96 "	0·0243 "
Average for 1881—90	5·28 "	0·0259 "

It hence appears that the receipts also per poud and per poud-verst are constantly tending to diminish, having been least in 1889, and having risen a little in 1890.

The distribution of the total amount of the gross income in 1890, by months is as follows:

The receipts of gross income were:	Percentage of the total for the year.
In January 22,567,000	8·0
" February 19,554,000	6·9
" March 19,033,000	6·7
" April 19,701,000	6·9

1. Except free passengers.

2. Except journeys made by free passengers.

			Percentage of the total for the year.
In May	23,732,000 roubles.		8·3
„ June	21,959,000 „		7·7
„ July	21,651,000 „		7·6
„ August	26,913,000 „		9·5
„ September	26,676,000 „		9·7
„ October	26,132,000 „		9·2
„ November	23,762,000 „		8·3
„ December	31,851,000 „		11·2
Total . . . 284,531,000 roubles			100·0

These figures shew that the greatest percentage of the gross income of 1890 was received in the month of September, leaving out of account the considerable rise in December, which is explained, moreover, by the inclusion in the December receipts of the income for the whole year from various items not connected with traffic.

The distribution of the working expenses in 1890 appears from the following figures:

Divisions.		Per verst of line.	Per 100 train- versts.	Per 10,000 car axle-versts.	Per cent. of ex- penses of man- agement and services.
I. Central manage- ment	13,463,000 R.	—	—	—	—
II. Local management. Management, total.	8,867,000 „ 22,330,000 „	— 837 R.	— 18 R.	— 33 R.	— 14 per cent.
III. Service of line and buildings.	46,635,000 „	1,748 „	37 „	69 „	29 „ „
IV. Service of locomotives and rolling stock. . .	59,344,000 „	2,224 „	48 „	87 „	37 „ „
V. Service of traffic and telegraphs . . .	31,777,000 „	1,191 „	26 „	47 „	20 „ „
Total, management and service . . .	160,086,000 „	6,000 „	129 „	236 „	100 „ „
In addition:					
VI. Unavoidable ex- penses	3,697,000 „	139 „	3 „	6 „	
VII. Extraordinary ex- penses	1,532,000 „	58 „	1 „	2 „	
VIII. Expenditure on fin- ancial operations . .	2,050,000 „	77 „	2 „	3 „	
IX. Expenditure on tax- ing of service traffic	4,409,000 „	165 „	4 „	7 „	
Total amount of work- ing expenses . . .	171,774,000 „	6,439 „	139 „	254 „	

The distribution of the net income from working the railways in 1890 appears from the following figures:

	Roubles.	Percentage of total amount.
Devoted to extraordinary works and expenses, reserve capital, rewards to servants, and various special objects	5,338,000	5
Laid out on obligatory payments in respect to stock capital and loans on account of bond capital	84,711,000	74
Paid to the Government on account of debts in respect to guarantee of possession of the railway and for other reasons (i. e. shares due to government)	6,346,000	6
Paid in dividend upon shares beyond and without guarantee, and remainder of net income of State railways	16,655,000	15
Total . . .	113,050,000	100

The amount of obligatory payments in respect to stock capital and loans on account of bond capital for 1890 was 119,183 thousand roubles. As 84,711 thousand paper roubles of the net income were devoted to these payments, there was wanting 34,472 thousand paper roubles of net income to cover these payments.

Railway Traffic.

The traffic operations of the railways appear from the following figures:

Number and work of trains:	Trains despatched.	Tr in-versts.
In 1881	683,882	93,365,346
" 1882	714,964	97,034,998
" 1883	758,908	102,537,334
" 1884	783,751	101,807,305
" 1885	836,820	103,074,889
" 1886	848,426	101,101,534
" 1887	918,428	110,302,841
" 1888	1,104,466	120,366,542
" 1889	1,136,296	122,260,951
" 1890	1,181,434	123,996,303
Average for 1881—90 .	896,738	107,584,804

The number of train-versts to each verst of the railway system was on an average as follows:

	Per year.	In 24 hrs.		Per year.	In 24 hrs.
In 1881 . . .	4,379	12·05	In 1886 . . .	4,161	11·56
" 1882 . . .	4,431	12·46	" 1887 . . .	4,411	12·36
" 1883 . . .	4,682	12·99	" 1888 . . .	4,746	13·07
" 1884 . . .	4,523	12·56	" 1889 . . .	4,646	12·89
" 1885 . . .	4,422	12·17	" 1890 . . .	4,648	12·91
			Average for 1881—90.	4,530	12·41

The train-versts are distributed according to different kinds as follows:

Of the whole number of train-versts there belonged to:

		Ordinary traffic.			
		High and medium speed.	Low speed.	Military.	Service.
P e r c e n t a g e s.					
1881	. . .	37·99	57·05	0·72	4·24
1882	. . .	37·13	58·47	0·62	3·78
1883	. . .	34·65	61·11	0·71	3·54
1884	. . .	34·93	60·85	0·63	3·59
1885	. . .	35·32	60·42	0·65	3·61
1886	. . .	36·18	59·14	0·79	3·89
1887	. . .	33·51	62·33	0·62	3·54
1888	. . .	31·49	64·28	0·79	3·44
1889	. . .	32·37	63·17	0·64	3·94
1890	. . .	33·96	61·04	0·81	4·19
Average for 1881—90		34·59	60·93	0·70	3·78

The distribution of the numbers and runs of the trains by months, according to the data for 1890, is as follows:

	Trains despatched.		Train-versts.	
	Number.	Percentage of annual number.	Total.	Percentage of annual run.
In January	87,812	7.44	10,515,142	8.48
„ February	77,856	6.68	9,044,639	7.29
„ March	82,953	7.03	9,329,069	7.52
„ April	84,117	7.12	8,766,868	7.07
„ May	105,844	8.96	10,587,215	8.54
„ June	106,804	9.04	10,178,168	8.21
„ July	108,341	9.17	10,002,197	8.07
„ August	114,439	9.69	11,158,602	9.00
„ September	111,392	9.43	11,476,896	9.26
„ October	108,172	9.15	10,977,387	8.85
„ November	95,940	8.12	10,589,028	8.54
„ December	97,764	8.27	11,371,092	9.15
Total . . .	1,181,434	100.00	123,996,303	100.00

The work of the cars, performed in the composition of the above trains, is as follows:

Axle-versts performed by all the cars:

	Total in thousands.	Per verst of railway system.
„ 1881	4,327,336	203,812
„ 1882	4,629,442	217,131
„ 1883	5,123,596	233,943
„ 1884	5,189,915	230,591

	Total in thousands.	Per verst of railway system.
In 1885	5,278,159	224,300
" 1886	5,152,446	212,078
" 1887	5,905,579	238,320
" 1888	6,540,012	255,729
" 1889	6,634,885	251,884
" 1890	6,772,252	253,842
Average for 1881—1890	5,555,302	231,163

According to the kinds of cars the work is distributed in the following manner in percentages:

Of the total number of axle-versts there were performed:

	By passenger carriages, includ. post.	By goods includ. luggage.
In 1881	20 per cent.	80 per cent.
" 1882	19 " "	81 " "
" 1883	19 " "	81 " "
" 1884	17 " "	83 " "
" 1885	16 " "	84 " "
" 1886	18 " "	82 " "
" 1887	16 " "	84 " "
" 1888	16 " "	84 " "
" 1889	16 " "	84 " "
" 1890	16 " "	84 " "

Comparing the train-versts with the car axle-versts, the result is obtained, that the composition of an average train contained car-axes:

In 1882	47.70	In 1886	50.96
" 1883	50.02	" 1887	53.54
" 1884	50.98	" 1888	54.33
" 1885	50.92	" 1889	54.27
		" 1890	54.62

The average composition of trains according to kinds of traffic, according to data existing only since 1885, appears from the following figures:

	Ordinary traffic.			S e r v i c e.		
	High and medium speed.	Low speed.	Military.	Servants, workmen, directors, inspec- rots, government.		Others.
				E	S.	
In 1885	30.56	63.63	54.86	64.13		39.80
" 1886	35.58	60.72	55.01	80.68		33.52
" 1887	36.61	62.82	57.57	73.03		44.14

		Ordinary traffic.		Military.	S e r v i c e.		
		High and medium speed.	Low speed.		Servants, workmen, directors, inspectors, Others. government.		
			A X	L	E	S.	
In 1888	„ . . .	36·83	63·40	57·18		26·76	31·71
„ 1889	„ . . .	37·54	63·45	58·03		65·51	44·90
„ 1890	„ . . .	36·42	64·91	58·63		62·40	48·73

From the data above given it appears that the average composition of all the trains and in particular of the ordinary and military traffic increases from year to year. The composition of the service trains fluctuates, depending, of course, upon the requirements of the railways.

Work of the locomotives.

The number of engine-versts performed by all the engines was:

In 1881	126,918,011	In 1886	134,525,081
„ 1882	130,613,253	„ 1887	145,741,025
„ 1883	137,533,000	„ 1888	162,894,145
„ 1884	136,018,751	„ 1889	164,932,356
„ 1885	139,336,765	„ 1890	166,215,177
		Average for 1881—1890	144,472,756

The following was the distribution per cent among the

		T r a i n s.					
		Ordinary traffic.		Military.	Service.	Total.	Without trains.
		High and middle speed.	Low speed.				
In	1881 . . .	28·96	44·71	0·55	3·08	77·30	22·70
"	1882 . . .	29·00	46·08	0·48	2·67	78·26	21·77
"	1883 . . .	26·82	48·58	0·56	2·65	78·63	21·37
"	1884 . . .	27·00	48·49	0·50	2·70	78·69	21·31
"	1885 . . .	27·08	47·50	0·50	2·76	77·84	22·16
"	1886 . . .	28·25	47·03	0·62	2·97	78·87	21·13
"	1887 . . .	26·17	50·14	0·49	2·69	79·49	20·51
"	1888 . . .	24·43	50·80	0·61	2·59	78·43	21·57
"	1889 . . .	25·00	49·62	0·51	2·93	78·06	21·94
"	1890 . . .	26·59	47·78	0·62	3·16	78·15	21·85
Aver. for 1881—1890		26·78	48·21	0·55	2·82	78·36	21·64

The total number of versts run by the engines was distributed in percentages as follows:

		Wood fuel.	Mineral fuel.			Wood fuel.	Mineral fuel.
In 1881 . . .		46·07	53·93	In 1886 . . .		42·75	57·25
„ 1882 . . .		45·86	54·14	„ 1887 . . .		42·23	57·77
„ 1883 . . .		74·43	52·57	„ 1888 . . .		41·97	58·03
„ 1884 . . .		45·08	54·92	„ 1889 . . .		40·26	59·74
„ 1885 . . .		42·51	57·49	„ 1890 . . .		35·98	64·02
				Aver. for 1881—90.		42·75	57·25

The expenditure on 100 engine-versts was:

	Wood fuel. Roubles.	Mineral fuel. Roubles.
In 1881	10 · 75	13 · 11
" 1882	10 · 50	13 · 20
" 1883	10 · 12	12 · 91
" 1884	10 · 02	12 · 50
" 1885	9 · 75	11 · 60
" 1886	9 · 58	10 · 79
" 1887	9 · 42	9 · 54
" 1888	9 · 20	10 · 63
" 1889	8 · 46	10 · 06
" 1890	7 · 88	9 · 56
Average for 1881—90.	9 · 57	11 · 39

The quantity and cost of the fuel expended in heating the engines are given by the following figures:

	Wood fuel.		Mineral fuel.		Total cost.
	Cub. sagues.	Roubles.	Pouds.	Roubles.	Roubles.
In 1881	426,278	6,453,131	67,294,210	8,802,182	15,255,313
" 1882	424,772	6,470,111	67,828,553	8,971,437	15,441,548
" 1883	465,036	6,873,069	68,772,182	9,060,737	15,933,806
" 1884	430,068	6,378,587	69,359,647	9,106,555	15,485,142
" 1885	397,024	5,988,686	71,491,035	9,079,576	15,068,262
" 1886	378,438	5,681,970	67,515,970	8,139,669	13,821,639
" 1887	409,492	5,942,031	73,553,106	8,575,556	14,517,587
" 1888	461,325	6,473,997	84,796,605	9,851,033	16,325,030
" 1889	440,865	5,650,356	87,670,196	9,775,815	15,426,171
" 1890	387,887	4,857,350	87,448,215	10,023,683	14,881,033
Av. for 1881—90	422,119	6,076,956	76,572,872	9,138,624	15,215,353

This expenditure compared with the total working expenses of the railways formed:

In 1881 . . .	10·5 per cent.	In 1887 . . .	10·1 per cent.
" 1882 . . .	10·6 " "	" 1888 . . .	10·2 " "
" 1883 . . .	10·7 " "	" 1889 . . .	9·1 " "
" 1884 . . .	10·7 " "	" 1890 . . .	8·7 " "
" 1885 . . .	10·6 " "	Aver. for 1881—90	10·1 " "
" 1886 . . .	9·8 " "		

The cost of a unit of fuel 1890—1881 varied in the following manner:

	Cub. sagues wood.	Poud anthracite.	Poud coal.	Poud pet- roleum.
In 1881	15 · 14 R.	15 kop.	12 kop.	. . .
" 1882	15 · 23 "	16 "	12 "	. . .
" 1883	14 · 77 "	14 "	12 "	12 kop.

	Cub. sagues. wood.	Poud anthra- cite.	Poud coal.	Poud petro- leum.
In 1884	14 · 83 R.	13 kop.	13 kop.	16 kop.
" 1885	15 · 08 "	12 "	12 "	17 "
" 1886	15 · 01 "	12 "	12 "	15 "
" 1887	14 · 51 "	11 "	11 "	14 "
" 1888	14 · 03 "	13 "	11 "	13 "
" 1889	12 · 81 "	15 "	11 "	13 "
" 1890	12 · 52 "	13 "	11 "	15 "

The heating values of the various kinds of mineral fuel employed by the railways according to the information for 1890 are as follows:

One cubic sague of wood fuel is equivalent to:

Petroleum	71 poud.
Euglish coal	98 "
Donets anthracite	99 "
Kuban coal	100 "
Briquette	101 "
Coke	101 "
Donets steam coal	109 "
Coal from Poland.	117 "
Silesian coal	119 "
Ural coal	125 "
Tkvibulsk coal	150 "
Coal from near Moscow	196 "
Peat	227 "
Mineral fuel in general	104 "

The traffic and runs by passengers and goods over the railway system are expressed by the following figures:

Years.	Passengers ¹ carried in thousands.	Passenger- versts in ² thousands.	Passenger- versts per verst of rail- way system.	Mean run per passenger in versts.
1881	34,439	3,485,203	164,185	101·38
1882	37,210	3,701,974	173,630	99·76
1883	37,561	3,829,482	174,862	101·95
1884	37,799	3,748,167	166,532	99·16
1885	37,586	3,683,248	156,501	98·00

¹ In addition to which, free:

In 1888	2,101,000 passengers.
" 1889	2,214,000 "
" 1890	2,202,000 "

² In additon to which, by free passengers:

In 1888	280,695,000 passenger-versts.
" 1889	297,381,000 "
" 1890	304,368,000 "

Years.	Passengers ¹ carried in thousands.	Passenger- versts in ² thousands.	Passenger- versts per verst of rail- way system.	Mean run per passenger in versts.
1886	37,885	3,672,163	151,149	96·98
1887	38,159	3,741,775	151,000	92·82
1888	40,865	4,070,074	159,149	99·60
1889	42,791	4,192,386	159,318	97·97
1890	44,303	4,392,266	164,746	99·21
Average for 1881—90	38,860	3,851,974	161,752	99·12

Years.	Freights carried in thousand pouds.	Poud-versts in thousands.	Poud-versts per verst of railway system.	Mean run per poud in versts.
1881	2,562,373	496,151,379	23,368,094	195·95
1882	2,754,248	549,303,311	25,763,515	199·46
1883	3,045,322	619,332,718	28,280,033	203·37
1884	3,020,799	625,986,245	27,812,958	207·23
1885	3,152,015	642,678,600	27,307,355	203·90
1886	3,176,689	622,084,521	25,605,455	195·83
1887	3,644,564	747,619,092	30,170,262	205·13
1888	3,979,634	853,489,539	33,331,643	214·46
1889	4,185,172	873,673,461	37,002,108	208·75
1890	4,179,412	854,035,954	32,011,529	204·34
Average for 1881—90	3,370,023	688,435,446	29,160,801	204·28

The data given above shew that the transport of passengers and goods and the number of passenger and poud-versts performed by them increased greatly during the decade, but the mean run per verst per passenger and per poud in versts shewed fluctuations. The mean run however for goods during the last four years (1887—1890), especially in 1888 and 1889, was longer than for the preceding years (1881—1886).

The distribution of the private passenger and slow goods traffic and the receipts from this traffic according to months for 1890, was as follows:

	Private passenger.		Slow goods traffic.	
	Carried.	Received.	Carried.	Received.
	Thous. pass.	Thous. roub.	Thous. poud.	Thous. roub.
In January . . .	2,555	3,111	285,638	16,429
„ February . . .	2,342	2,853	253,197	14,146
„ March . . .	2,936	3,446	225,268	12,846
„ April	3,772	4,499	218,312	12,316
„ May	4,148	4,518	282,781	15,661
„ June	4,095	4,125	262,289	14,560
„ July	4,396	4,289	242,834	14,016
„ August	4,320	4,877	302,462	17,880
„ September . . .	3,229	4,076	330,614	18,966

	Private passengers.		Slow goods.	
	Carried. THOUS. PASS.	Received. THOUS. ROUB.	Carried. THOUS. POUNDS.	Received. THOUS. ROUB.
In October . . .	3,292	4,164	323,101	18,252
„ November. . .	2,819	3,361	292,543	16,971
„ December, . .	2,718	3,290	300,986	17,683
Total . . .	40,622	46,609	3,320,025	189,726

Comparing next the transport of passengers and goods with the work of the carriages it appears that to one axle there were in:

Passenger carriages.		Goods cars.	
1881	4.06 passengers	1881	145 pounds.
1882	4.30 „	1882	148 „
1883	4.59 „	1883	148 „
1884	4.23 „	1884	147 „
1885	4.14 „	1885	148 „
1886	4.18 „	1886	147 „
1887	4.10 „	1887	151 „
1888	4.22 „	1888	155 „
1889	4.19 „	1889	157 „
1890	4.20 „	1890	151 „
Aver. for 1881—90	4.19 „	Aver. for 1881—90	150 „

Referring these data to the number of places in the passenger carriages and to the freightage of the goods cars, it appears that there were used:

		Places in passenger carriages.	Freightage of goods cars.
In 1881 . . .	33 per cent		49 per cent
„ 1882 . . .	34 „ „		50 „ „
„ 1883 . . .	35 „ „		50 „ „
„ 1884 . . .	34 „ „		49 „ „
„ 1885 . . .	33 „ „		50 „ „
„ 1886 . . .	33 „ „		49 „ „
„ 1887 . . .	33 „ „		50 „ „
„ 1888 . . .	34 „ „		51 „ „
„ 1889 . . .	33 „ „		52 „ „
„ 1890 . . .	34 „ „		49 „ „
Aver. for 1881—90 . .	34 „ „		50 „ „

Railway Accidents.

The total accidents to persons upon the railways were.

	Killed.	Injured.	Total.
In 1886	420	993	1,413 ¹
„ 1887	489	1,070	1,559 ¹
„ 1888	547	1,290	1,837 ¹
„ 1889	580	1,140	1,720 ¹
„ 1890	589	1,347	1,936 ¹
Average for 1886—1890 . .	525	1.168	1,693

Thus the year 1890 both in reference to the total number of accidents and to the number of killed and injured is the most disastrous of the five years 1886—1890.

The accidents which happened during the traffic were:

	Killed.	Injured.	Total.
In 1886	385	653	1,038
„ 1887	444	697	1,141
„ 1888	529	922	1,451
„ 1889	561	827	1,388
„ 1890	565	913	1,478
Average for 1886—1890 . .	497	802	1,299

Thus out of the total number of accidents the majority belongs to cases during the traffic, namely: in 1886, 73 per cent; in 1887, 73 per cent; in 1888, 79 per cent; in 1889, 81 per cent; and in 1890, 76 per cent.

The relation between the number of accidents during traffic to the traffic itself is expressed by the following data:

To 1,000,000 train-versts there were:

	Killed.	Injured.	Total.
In 1886	3.8	6.5	10.3
„ 1887	4.0	6.3	10.3
„ 1888	4.4	7.7	12.1
„ 1889	4.6	6.8	11.4
„ 1890	4.6	7.4	12.0
Average for 1886—1890 . .	4.3	6.9	11.2

¹. And accidents to persons upon the railways in cases not immediately connected with railway business e. g., sudden, death, attacks by criminals, lightning, et cetera.

	Died.	Injured.	Total.
In 1886	129	52	181
„ 1887	141	79	220
„ 1888	163	78	241
„ 1889	170	86	256
„ 1890	137	111	248

Among the total number of accidents during traffic there were:

	Passen- gers.	Railway servants and workmen.	Outsiders.
1886	116	523	399
1887	107	594	440
1888	205 ¹	739	507
1889	106	667	615
1890	131	695	652
Average for. 1886—1890 .	133	644	523

Consequently, almost half the accidents to persons during the traffic falls to the share of railway servants and workmen.

These data when arranged according to the different classes of persons appear as follows:

a. Passengers:

	Killed.	Injured.	Total.
1886	18	98	116
1887	19	88	107
1888	52	153	205 ¹
1889	29	77	106
1890	28	103	131
Average for. 1886—1890 .	29	104	133

The number of passengers killed out of the total accidents formed in 1886, 16 per cent; in 1887, 18 per cent; in 1888, 25 per cent; in 1889, 27 per cent; and in 1890, 21 per cent.

The passengers are further divided according to the kind of accident in the following manner:

	Leaving rails and collisions.		Other causes during traffic.	
	Killed.	Injured.	Killed.	Injured.
1886	—	27	18	71
1887	—	1	19	87
1888	32	73	20	80
1889	—	3	29	74
1890	—	1	28	102

¹. Such a considerable number of accidents to passengers compared with former years is explained by two catastrophes: 1. Moscow-Brest rly, May 1, 1888, collision of trains; 2. Kursk-Kharkov-Azov, October 17, 1888, train leaving rails near Borki.

According to the cause:	By own fault.		Not by own fault.	
	Killed.	Injured.	Killed.	Injured.
1886	18	70	—	28
1887	19	84	—	4
1888	20	79	32	74
1889	29	74	—	3
1890	28	101	—	2

Compared with the number of passengers travelling, and to the distance travelled, the numbers of accidents were:

	Per million pass.	Per million pass.-versts.
1886	3·0	0·03
1887	2·8	0·03
1888	4·8 ¹	0·05 ¹
1889	2·4	0·02
1890	2·8	0·03

b. Railway servants and workmen.

	Killed.	Injured.	Total.
1886	153	370	523
1887	185	409	594
1888	217	522	739
1889	197	470	667
1890	209	486	695
Average for. 1886—1890 .	192	452	644

The proportion of killed among the accidents to servants and workmen was: in 1886, 29 per cent; in 1887, 31 per cent; in 1888, 29 per cent; in 1889, 30 per cent; and in 1890, 30 per cent.

The number of accidents to servants and workmen is distributed according to the kind of accident as follows:

	Leaving rails and collisions.		Shunting rolling-stock.		Other cases during traffic.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
1886	6	28	44	129	103	213
1887	10	50	46	156	129	203
1888	8	77	65	250	144	195
1889	5	43	82	251	110	176
1890	6	53	58	247	145	186

According to the cause:

	By own fault.		Not by own fault.	
	Killed.	Injured.	Killed.	Injured.
1886	144	308	9	62
1887	171	332	14	77

¹. Vide note on previous page.

According to the cause:

	By own fault. Killed.	Injured.	Not by own fault. Killed.	Injured.
1888	199	410	18	112
1889	193	407	4	63
1890	203	419	6	67

In reference to the train traffic, the accidents to servants and workmen per million train-versts were: in 1886, 5.2; in 1887, 5.4; in 1888, 6.1; in 1889, 5.5; in 1890, 5.6.

Among the accidents to servants and workmen in 1890 there were:

Engine-drivers and stokers . . .	62	9 per cent.
Conductors	98	14 " "
Shunters and couplers	81	11 " "
Pointsmen	75	11 " "
Watchmen.	97	14 " "
Others	282	41 " "
	695	100 per cent.

c. Outsiders.

	Killed.	Injured.	Total.
1886	214	185	399
1887	240	200	440
1888	260	247	507
1889	335	280	615
1890	328	324	652
Average for. 1886—1890 . .	276	247	523

The proportion of killed to the accidents formed in 1886, 53 per cent; in 1887, 55 per cent; in 1888, 51 per cent; in 1889, 55 per cent; and in 1890, 51 per cent.

Referring the number of accidents to outsiders to the train traffic, it appears that to one million train-versts there were: in 1886, 4.0; in 1887, 4.0; in 1888, 4.2; in 1889, 5.0 and in 1890, 5.3.

Among the total number of accidents during the traffic, suicides and attempts at suicide, exclusive of suicides in the carriages, formed:

	Died, suicides.	Injured, attempts.	Total.
1886	62	14	76
1887	70	12	82
1888	70	10	80
1889	68	25	93
1890	80	15	95
Average for. 1886—1890 . .	70	15	85

That is to say in 1886, 7 per cent; in 1887, 7 per cent; in 1888, 6 per cent; in 1889, 7 per cent; and in 1890, 6 per cent.

The cases of accidents outside the railway traffic, i. e., in loading and unloading goods, in workshops, in carrying out works etc., comprised:

	Killed.	Injured.	Total.
In 1886.	35	340	375
„ 1887.	45	373	418
„ 1888.	18	368	386
„ 1889.	19	313	332
„ 1890.	24	434	458
Average for 1886—1890	28	366	398

Consequently, accidents resulting in death formed in 1886, 9 per cent; in 1887, 11 per cent; in 1888, 5 per cent; in 1889, 6 per cent.; and in 1890, 5 per cent.

The accidents are distributed as follows in reference to the cause:

	By own fault.		Not by own fault.	
	Killed.	Injured.	Killed.	Injured.
In 1886	24	278	11	62
„ 1887	23	301	22	72
„ 1888	12	302	6	66
„ 1889	14	274	5	39
„ 1890	20	380	4	54

The following represents the information upon the number of railway servants and workmen, and their wages according to the data of 1890:

Number and wages of railway servants and workmen.

The total number of servants and workmen upon the system of Government and private railways, not counting inspectors, directors, the railway police composed of gendarmes, the officials of the post office, the railway schools of the Ministry of Ways of Communication, and workmen hired by contractors, was as follow:

	Total.	Per verst.
Permanent staff of servants and workmen.	167,464	6.3
Temporary servants and workmen, except-		
ing those hired by the day,	10,447	0.4
Workmen hired by the day	74,504	2.8
Total of servants and workmen	252,415	9.5

Of the total of servants and workmen given above the permanent staff formed about 66 per cent, while the temporary and day workmen were about 34 per cent.

The expenditure upon wages to the whole of the servants and workmen upon the railways was as follows:

	Total.
Permanent staff of servants and workmen	62,024,953 roubles.
Temporary servants and workmen except those hired by the day	2,010,975 "
Day labourers	17,514,340 "
Total	81,550,268 roubles.

Comparing the said expenditure of the railways with their gross income and their total working expenses, it appears that the wages of all the servants and workmen formed 29 per cent of the gross income, and 47 per cent of the total expenses.

The proportion borne by the wages of the servants and workmen in the different services to the total expenses upon such services is given by the following figures:

S e r v i c e s.	Expenditure.
Line and buildings	38 per cent.
Telegraph	90 " "
Traffic	74 " "
Engines and rolling stock	51 " "

The number of servants and workmen upon the railways, and the expenditure upon their maintenance are distributed in reference to the different services and the general management in the following manner:

General management:	Number,	Maintenance.
Central	2,352	3,672,434 roubles.
Local	13,615	9,224,857 "
Services:		
Line and buildings	101,111	17,082,661 "
Telegraph	8,919	3,152,590 "
Traffic	58,702	19,205,504 "
Engines and rolling stock	68,023	29,212,222 "
Total	252,415 ¹	81,550,268 roubles.

The greatest number of men, as appears from these data, is required for the service of the line and buildings, namely, about 40 per cent of the total number of servants and workmen; the second place is taken by the service of the engines and rolling stock, about 7 per cent; the telegraph service employs 27 per cent; further, the general management takes up about 6 per cent, of whom 1 per cent is in the Central management.

¹. Included are 307 men who fulfilled duties in respect of two services, shewn in the total only under one.

The remuneration of the servants and workmen upon the railways reduced to that received per man is expressed by the following figures:

	Permanent, per year.	Temporary per year.	Per diem.
General management:			
Central	1,580 roubles	276 roubles	55 kop.
Local	796 "		
Services:			
Line and buildings. . . .	182 "	158 "	47 "
Telegraph.	371 "	167 "	62 "
Traffic.	341 "	212 "	67 "
Engines and rolling stock	611 "	253 "	1.03 "

On the whole, the average cost of maintenance per servant upon the railway system in 1890 was: permanent, 370 roubles, and temporary, 192 roubles, per annum. A workman hired by the day received on an average 78 kopecks per diem. Most of all cost a permanent servant in the Central management, 1,580 roubles per annum; next in the local management, 796 roubles per annum. On examining the cost of maintenance in reference to the different services, it appears that a servant or workman in the service of the engines and rolling-stock cost most of all, and in the service of the line and buildings, least.

Out of the total quantity of goods carried by the railways, slow goods form about 80 per cent, as freight, and about 88 per cent as distance. On account of the great importance of the slow goods traffic upon the railways, a review of this traffic is given below. From the data exhibiting the quantity of goods carried, the transfer at junctions from one Russian railway to another is excluded; this forms about 40 per cent. of the total freight.

In dependence upon the point of view from which the slow goods traffic upon the railways may be regarded, namely, either in reference to the whole railway system or in reference to each separate line, the data upon the traffic of these goods are subdivided into two parts. In each case, at first the quantity of goods carried is considered, and then the activity of the system or individual line, i. e., the distance covered by the goods.

A. Goods traffic upon the railway system.

a. The total quantity of slow goods carried by the railway system, exclusive of transfer at the junctions from one Russian railway to another, was:

	P o u n d s.
1888 ¹	1,927,500,000
1889	1,931,600,000 ²
1890	1,967,400,000 ²

Of this, there were carried as follows:

				Millions pouds.	
In the internal communication of the different railways, i. e., from a station of one railway to another of the same	{	1888 . .	1,150·6	„ 59·7 per cent.	
		1889 . .	1,068·7	„ 55·3	„ „
		1890 . .	1,204·9	or 61·3	„ „
In direct communication, i. e. from a station of one railway to a station of another	{	1888 . .	776·9	„ 40·3	„ „
		1889 . .	862·9	„ 44·7	„ „
		1890 . .	762·5	„ 38·7	„ „

Included, carried ³ from the	{	1888	74,100.000	pouds.
Russian railways to the foreign . . .		1889	67,100,000	„
		1890	47,500.000	„

1. The quantity of slow goods traffic for the past few years is expressed beginning with 1888, by the following figures:

1881	1,286,100,000	pouds.
1882	1,373,800,000	„
1883	1,456,400,000	„
1884	1,454,800,000	„
1885	1,510,300,000	„
1886	1,477,900,000	„
1887	1,700.500,000	„

2. In reference to these quantities it must be observed that transfer from one Russian railway to another is not counted. At the same time such freights are included as were registered twice or even more times for other reasons. Thus, e. g., many owners of goods, guided by considerations of trade, despatch freights originally to warehouses in the larger trading centres, where the same are registered by the railway on their arrival and then after an interval of time, the same goods are sent further and are entered as despatched a second time.

3. In reference to the direct communication of the Russian railways with the foreign and vice versa, it must be observed that the figures cited are far from exhausting the whole quantity of exports and imports over the frontier stations, these goods being registered on the Russian railways either as „internal arrival“ or „internal despatch“. Complete information upon the exports and imports over the frontier by all kinds of communications are prepared and published by the Ministry of Finance in the „Review of Foreign Trade“.

From foreign to Russian	{	1888	21,100,000 pouds.
		1889	17,100,000 "
		1890	16,400,000 "

The transport of the chief kinds of goods by the railway system in 1888, 1889 and 1890 is expressed by the following data:

G o o d s:	1888.		1889.		1890.	
	Million pouds.	Per cent.	Million pouds.	Per cent.	Million pouds.	Per cent.
1. Wheat	206·9	10·7	147·0	7·6	147·7	7·5
2. Wheat flour	45·6	2·4	45·0	2·0	47·0	2·4
3. Rye	96·9	5·0	69·6	3·4	60·3	3·1
4. Rye flour	31·8	1·7	34·0	1·8	32·3	1·6
5. Oats	106·8	5·5	94·2	4·9	87·2	4·4
6. Barley	54·7	2·8	33·2	1·7	33·4	1·7
Total ¹ (1—6) . .	542·4	28·1	423·0	21·7	407·9	20·7
7. Salt	55·7	2·9	60·6	3·1	58·5	2·9
8. Petroleum and petroleum waste ²	19·5	1·0	27·8	1·4	34·7	1·8
9. Kerosene and other petroleum products ²	67·3	3·5	76·8	4·0	81·5	4·1
10. Coal of all kinds, anthracite, ordinary coal, briquette and coke ²	241·7	12·5	289·7	15·0	266·9	13·6
11. Wood fuel ²	139·5	7·2	148·6	7·7	143·0	7·3
12. Timber	135·5	7·0	154·3	8·0	149·2	7·6
Total (1—12) .	1,201·6	62·2	1,180·8	60·9	1,141·7	58·0

In order to shew the places of despatch and arrival of goods, the data, per stations bearing upon this subject, may be collected into two groups: in respect to frontier and internal receiving stations, distinguishing among the former sea and land stations, and excluding from the latter the two chief centres of consumption, Moscow and Warsaw.

Of the total amount of goods despatched and received by the railway-system, there fell to the share of frontier receiving stations as follows:

		Despatch. millions pouds.	Arrival. pouds.
Baltic	{	1888	69·1
		1889	57·3
		1890	59·6

¹. Besides this, in 1888, maize 16·0; in 1889, 21·8; and in 1890, 19·4 million pouds.

². Besides these quantities, a certain quantity of service freights is transported.

		Despatch. Millions pouds.	Arrival.
Black Sea	{ 1888	18.9	153.4
	{ 1889	66.5	246.0
	{ 1890	68.7	259.2
Sea of Azov	{ 1888	12.2	102.2
	{ 1889	13.4	69.6
	{ 1890	11.9	57.8
Prussian frontier	{ 1888	75.9 ¹	77.7
	{ 1889	85.9 ¹	81.1
	{ 1890	84.0 ¹	70.0
Austrian "	{ 1888	11.2	11.2
	{ 1889	10.1	14.1
	{ 1890	11.0	11.6
Rumanien	{ 1888	5.0	1.1
	{ 1889	4.6	2.6
	{ 1890	4.5	0.8
Total for frontier receiving stations	{ 1888	192.3	571.0
	{ 1889	237.8	589.4
	{ 1890	239.7	577.8
To the share of internal receiving stations including	{ 1888	1,735.2	1,356.5
	{ 1889	1,693.8	1,342.2
	{ 1890	1,727.7	1,389.6
Moscow.	{ 1888	44.3	210.9
	{ 1889	34.3	214.5
	{ 1890	43.6	217.0
Warsaw	{ 1888	19.1	73.7
	{ 1889	21.1	77.1
	{ 1890	18.1	72.9

The general characteristic distinction between the indicated groups of receiving stations consists in the preponderance of arrivals over despatches by sea, and the preponderance of despatches over arrivals in the internal receiving points.

Next may be considered how the arrivals were distributed in 1890, according to the kinds of goods, in the frontier stations, which present an interest from the point of view of foreign trade, as also in the two chief internal receiving stations, Moscow and Warsaw.

¹. This includes in 1888, 56 million pouds, in 1889, 58 million pouds, and in 1890, 54 million pouds of coal from local mines, despatched from Sosnovice and transported in the direction of Warsaw, Lodz and Lowicz.

There arrived at the receiving stations as follows:

	Baltic.	Black Sea.	Sea of Azov.	Western land frontiers ¹ .			
				Prus- sian.	Aus- trian.	Moscow.	Warsaw.
	M i l l i o n s o f p o u d s.						
1. Wheat	9.7	69.5	12.5	6.9	1.4	0.9	0.2
2. Wheat flour	6.4	2.1	0.6	0.5	—	4.1	1.9
3. Rye	16.8	12.2	6.3	4.4	0.5	0.8	1.8
4. Rye flour	5.7	0.5	0.1	—	—	7.8	0.2
5. Oats	38.6	6.4	1.4	2.3	1.0	13.9	2.2
6. Barley	7.5	11.1	2.6	2.2	0.3	0.8	0.5
Total grain (1—6) . . .	84.7	101.8	23.5	16.3	3.2	28.3	6.8
7. Salt	0.6	1.0	0.2	0.4	0.1	1.0	0.5
8. Petroleum and petroleum waste	1.8	3.4	—	—	0.5	9.9	0.1
9. Kerosene and other petroleum products	2.4	48.4	0.1	0.8	0.2	1.7	2.9
10. Coal of all kinds, anthracite, ordinary coal, briquette and coke	0.1	5.0	18.4	0.6	0.3	7.8	—
11. Wood fuel	7.8	2.2	—	0.3	—	57.2	1.3
12. Timber	4.7	5.7	0.7	10.7	0.5	16.1	2.0
Total of goods (1—12). .	102.1	167.5	42.9	29.1	4.8	122.0	12.6
Total slow goods	178.4	259.2	57.8	70.0	11.6	217.0	72.9

From these data it appears that the arrivals at the sea and western land frontier receiving stations consisted principally of grain, viz.: at the points lying on the Baltic, 47.5 per cent of all; Black Sea, 39.3 per cent; Sea of Azov, 40.7 per cent; Prussian, 23.3 per cent and Austrian, 27.6 per cent. The arrivals at Moscow were principally wood fuel, 26.4 per cent; next grain, 13.2 per cent; at Warsaw, coal, 39.0 per cent and also grain, 9.3 per cent of the total quantity of goods.

b. The extent of the goods traffic on the railway system in a given year is expressed by the absolute number of poud-versts belonging to the whole railway system. For purposes of comparison however it is necessary to refer to relative quantities. In consequence of two elements entering into the result representing the extent of traffic, it is possible to select either one or the other of them, according to the object in view in making the comparison. If the intensity of the operations of the system is in comparison, the absolute num-

1. The total arrivals of slow goods at the Roumanian frontier were only 0.8 mill. pouds, which considered in reference to different kinds of goods fall into very small quantities.

ber of poud-versts in divided by the number of versts, expressing the length of the system. While, if the object is to ascertain the average distance accomplished by a poud of goods, the absolute number of poud-versts is divided by the total number of pouds transported.

For 1890, 1889 and 1888 the indicated quantities will be expressed by the following figures:

	1888	1889	1890
The total traffic of the railway system in reference to all slow goods was equal to .	770·3	763·2	762·2
Billion poud-versts.			
The average traffic of all slow goods per verst of the railway system formed ¹	30·4	29·4	28·6
Millions poud-versts.			
The average distance accomplished by one poud of all the slow goods equalled	400	395	388
V e r s t s.			

Next may be examined what share of the services of the railway system belongs to the principal goods.

With this object both the absolute number of poud-versts belonging to each kind of goods, for 1890 indicating their percentage relation to the traffic of all goods, and also the average distance accomplished by eachkind of goods in versts may be given:

T r a f f i c.			
	Billion poud-versts.	Proportion of slow goods per cent.	Average distance, in versts.
1. Wheat	53·2	6·9	361
2. Wheat flour	21·6	2·8	460
3. Rye	35·9	4·7	595
4. Rye flour	14·4	1·9	446
5. Oats	61·4	8·1	704
6. Barley	10·9	1·4	325
Total grain (1 — 6)	197·4	25·8	484
7. Salt	31·6	4·2	540
8. Petroleum and petroleum waste	15·9	2·1	459
9. Kerosene and other petroleum products	66·9	8·8	221
10. All kind of coal, anthracite, ordinary coal, briquette and coke	82·9	10·9	311
11. Wood fuel	16·7	2·2	117
12. Timber	28·5	3·7	191
Total of goods(1 — 12)	439·9	57·7	385

¹. The average traffic of all slow goods per verst of the railways for the previous period beginning with 1881, formed:

M i l l i o n s p o u d - v e r s t s.					
1881	20·8	1884	25·1	1886	22·6
1882	23·0	1885	24·4	1887	30·4
1883	25·6				

From these data it appears that about 26 per cent of the whole goods traffic of our railway system in 1890 belongs to the share of grain transport; about 32 per cent is allotted to the other goods named, and about 42 per cent to the remainder, i. e., to goods not named. From the above quoted data it also appears that the transport of wood fuel, timber, coal, barley and wheat was lower than the average, while that of the other above named goods was higher than the average, the greatest belonging to kerosene and other petroleum products.

B. Goods traffic upon the different railways.

a. The part played by each separate line in 1890 in respect of the quantity of goods carried is explained in the table below:

RAILWAYS.	Total.	G o o d s:						
		Grain.	Salt.	Petroleum and petr. waste.	Kerosene and other petrol. products.	Coal.	Wood fuel.	Timber.
		m i l l i o n				p o u n d s.		
South-western	326.5	86.9	10.8	0.4	2.5	9.3	6.2	13.0
Nicholas	179.3	48.7	1.1	1.6	5.9	6.4	17.1	8.2
Warsaw-Vienna	170.1	8.6	1.5	0.2	1.6	93.8	0.5	6.4
Moscow-Kursk	124.2	29.5	3.8	0.9	1.9	8.9	8.7	7.9
Oriol-Vitebsk	123.9	32.5	3.8	1.1	5.6	0.8	25.9	18.1
Kharkov-Nikolaev	116.7	34.4	8.4	0.043	0.8	24.9	0.4	8.7
Kursk-Kharkov-Azov	114.7	17.9	11.3	0.2	0.8	47.0	0.8	2.0
Donets	111.2	5.8	12.4	0.1	0.5	77.5	0.4	2.8
Kozlov-Voronezh-Rostov	108.5	36.1	2.0	1.7	4.7	27.0	0.6	2.9
Yekaterina	107.1	7.1	5.3	0.037	0.4	48.1	0.3	7.3
Moscow-Nizhni	101.3	10.7	2.9	14.6	4.4	0.3	7.3	4.4
Griazi-Tsaritsyn	100.8	25.7	3.1	6.6	12.2	0.2	0.016	23.5
Transcaucasian	95.5	4.1	0.9	3.5	49.3	0.7	1.6	1.0
Moscow-Riazan	94.9	44.0	0.2	2.2	3.2	1.4	0.9	1.0
Moscow-Brest	94.4	15.4	1.6	1.2	1.4	0.4	28.3	4.8
Vistula	93.6	14.5	4.2	0.1	4.7	13.8	1.5	6.3
Libau-Romny	90.8	35.4	2.8	0.1	1.3	0.2	3.7	6.1
Riazan-Kozlov	88.0	41.0	0.6	2.4	4.8	2.0	0.014	1.4
Syzran-Viazma	75.2	29.9	2.4	0.6	1.5	5.2	1.8	5.8
Oriol-Griazi	73.2	30.6	1.8	3.3	9.1	0.4	0.1	5.6
St. Petersburg-Warsaw	68.1	7.3	1.9	0.402	0.6	0.7	4.0	5.8
Vladikavkaz	60.3	32.7	0.8	1.4	0.4	1.7	1.3	3.4
Kursk-Kiev	58.1	16.2	3.7	0.2	1.0	1.1	0.3	2.6
Riga-Dvinsk	52.7	15.3	0.6	1.6	0.7	2.5	3.3	2.0

G o o d s :

RAILWAYS.

	Total. m	Grain. i l	Salt. l i	Petroleum and petr. waste. o n	Kerosene and other petr. prod. s	Coal. p o	Wood fuel. u d	Timber. s.
Dvinsk-Vitebsk	51.7	25.1	1.6	0.9	1.0	0.1	0.4	0.2
Lozovaya-Sebastopol . . .	49.0	16.5	7.8	0.006	0.3	7.0	0.1	5.6
Ural	48.4	11.0	0.6	0.010	0.6	8.0	1.3	0.8
Polesie	47.8	7.2	0.9	0.1	4.8	0.034	6.8	8.8
Ivangorod-Dombrova . .	46.9	3.7	1.2	0.005	0.4	20.8	0.1	5.3
Moscow- Yaroslav- Kostroma . .	46.1	3.0	0.6	2.7	0.5	0.4	6.6	6.2
Vologda- b. Yar.-Vologda	8.1	3.2	0.2	0.006	0.2	—	1.3	0.2
Baltic	46.0	15.0	0.9	0.025	0.5	0.7	5.0	1.6
Warsaw-Teraspol	42.0	11.9	0.5	0.1	3.6	0.8	0.4	0.5
Lodz	41.7	2.1	0.2	0.007	0.3	27.1	0.4	0.6
Fastov	41.7	9.4	2.7	0.027	0.4	4.4	1.2	3.8
Tambov-Saratov	28.4	12.7	1.1	1.2	1.7	0.1	0.1	1.3
Rybinsk-Bologovo	27.3	10.7	0.7	0.030	0.1	0.1	0.031	0.6
Orenburg	27.1	11.5	1.0	1.6	0.6	0.041	0.033	1.1
Shuisk-Ivanov	21.7	2.0	0.2	0.6	0.2	0.1	6.8	1.3
Tambov-Kozlov	19.9	5.8	0.3	0.9	1.7	0.1	—	0.007
Novotorzhsk	17.8	9.7	0.1	0.005	0.1	0.006	2.1	0.6
Baskunchak	11.5	—	11.4	—	—	—	—	—
Mitau	9.8	3.1	0.2	0.012	0.1	0.2	0.3	0.8
Samara-Zlatoust	8.4	3.1	0.5	0.2	0.2	0.031	0.025	0.7
Liven	7.9	5.3	0.2	0.029	0.047	0.028	—	0.6
Murom	7.3	0.4	0.010	0.030	0.1	0.006	2.8	0.7
Novgorod	6.0	1.5	0.1	—	0.1	0.024	0.4	0.1
Pskov-Riga	5.4	1.4	0.3	—	0.1	0.1	0.038	0.4
Riga-Tukum	2.8	0.5	0.022	—	0.037	0.022	0.2	0.3
Borovich	2.3	0.3	0.1	0.003	0.016	0.004	0.1	0.004
Tsarskoe Selo	1.4	...	...	...	...	...	...	...
Oboyansk . . . . .	...	...	...	...	...	...	...	...

From the above quoted data it appears that the goods named form on the greater part of the railways more than half of the total quantity of goods carried.

In reference to the preponderance of one or another kind of goods communication in 1890, all the railways are grouped in the following manner, the lines being placed in each group in order of magnitude, and the proportions per cent of the communication in question to the total being shown for each line:

1. Lines, carrying slow goods principally in their interior communications:

	Per cent.		Per cent.
Baskunchak	100·0	Mitau	57·6
Transcaucasian	100·0	Warsaw-Vienna.	57·5
Ural	100·0	Shuisk-Ivanov	56·7
Tsarskoe Selo	100·0	Baltic	48·9
Riga-Tukum	97·6	Moscow-Brest	47·1
Yaroslav-Vologda.	85·9	Orenburg	39·3
Vladikavkaz	85·5	Yekaterina	34·2
Moscow-Yaroslav	78·3	Moscow-Kursk	30·3
South-western	65·7	Kozlov-Voronezh-Rostov .	29·8
Moscow-Nizhni-Novgorod	58·2		

2. Lines, carrying goods principally received from the senders at their own stations and conveyed to other railways:

	Per cent.		Per cent.
Rybinsk-Bologovo	84·6	Samara-Zlatoust	50·5
Liven	78·1	Novgorod	50·0
Murom	76·6	Syzran-Viazma	48·6
Donets	72·8	Ivangorod-Dombrova. . .	48·3
Griazi-Tsaritsyn	57·4	Pskov-Riga	46·0
Tambov-Saratov	56·5	Novotorzhsk	38·7
Borovich	56·5	Fastov	38·1

3. Lines, carrying goods principally taken from other railways and handed to the receivers at their own stations:

	Per cent.		Per cent.
Lodz factory	90·2	Lozovaya-Sebastopol . . .	41·4
Riga-Dvinsk	51·2	Nicholas	39·2
Libau-Romny	43·1	St -Pbg.-Warsaw	34·6

4. Lines, carrying goods principally in transit:

	Per cent.		Per cent.
Tambov-Kozlov	88·4	Warsaw-Terespol	42·1
Dvinsk-Vitebsk	79·3	Moscow-Riazan	40·1
Riazan-Kozlov	77·0	Kursk-Kharkov-Azov . . .	35·3
Oriol-Griazi	66·0	Polesie	30·4
Vistula	55·9	Kharkov-Nikolaev	29·8
Kursk-Kiev	47·1		

b. The goods activity of each separate line for 1890, both absolute, indicating the traffic of all, and of the chief kinds of goods, and average total goods per verst of line, is expressed by the following data:

RAILWAYS.

	G o o d s		O t h e r c h i e f		g o o d s.	
	Total slow goods. Billion.	Grain. p o u n d - v e r s t s.	p o u n d - v e r s t s.	Billion.	Mill.	Average slow goods traffic per verst.
South-western	86.4	22.0	salt	5.8	38	
Nicholas	56.3	19.8	coal	2.6	90	
Transcaucasian	53.3	0.9	keros. and other petr. prod.	4.1	55	
Libau-Romny	33.8	17.5	salt	1.3	26	
Moscow-Brest	31.6	6.9	wood fuel	6.7	31	
Warsaw-Vienna	31.2	1.5	coal	19.7	68	
Kursk-Kharkov-Azov	29.4	2.7	"	12.9	39	
Griazi-Tsaritsyn	29.2	5.1	keros. and other petr. prod.	6.5	43	
Moscow-Kursk	28.3	6.0	coal	3.2	56	
Yekaterina	27.7	0.7	"	15.6	50	
Oriol-Vitebsk	27.7	12.6	timber	3.0	57	
Moscow-Nizhni Novgorod	25.1	2.0	petrol. and petrol. waste	5.4	59	
Syzran-Viazma	21.8	9.2	timber	0.8	17	
Kozlov-Voronezh-Rostov	21.1	7.7	coal	4.1	28	
Kharkov-Nicholaev	19.2	5.8	"	3.3	19	
Vladikavkaz	18.1	9.1	timber	0.9	20	
St.-P'b'g-Warsaw	17.1	1.3	"	0.9	14	
Oriol-Griazi	15.0	5.7	keros. and other petr. prod.	1.9	53	
Moscow-Riazan	14.9	7.4	" " " " "	0.5	64	
Ural	13.8	3.3	coal	1.1	14	
Lozovaya-Sebastopol	13.7	6.2	salt	2.4	22	
Polesie	13.5	3.2	keros. and other petr. prod.	3.3	10	
Kursk-Kiev	13.2	3.7	salt	0.9	30	
Vistula	12.8	2.1	coal	1.6	26	
Riazan-Kozlov	12.1	6.7	keros. and other petr. prod.	0.8	58	
Dvinsk-Vitebsk	11.7	5.9	salt	0.3	48	
Baltic	9.9	4.2	wood fuel	0.4	18	
Donets	9.2	0.9	coal	5.8	14	
Ivangorod-Dombrowa	7.7	0.5	"	4.4	11	
Riga-Dvinsk	7.4	2.8	timber	0.2	32	
Warsaw-Terespol	6.9	2.2	keros. and other petr. prod.	0.7	19	

RAILWAYS.		Total flow goods.		G o o d s.		Average slow goods traffic per verst.	
				O t h e r c h i e f			
				g o o d s.			
		Grain.					
		P o u d - v e r s t s.					
		Billion.				Billion Mill.	
Moscow	a. Mosc.-Yar.-						
Yaroslav-	Kostroma.	6·7	0·4	timber		1·1	19
Vologda.	b. Yar.-Vol. .	1·2	0·6	wood fuel		0·7	6
Rybinsk-Bologovo . . .		6·6	2·7	salt		0·2	24
Orenburg		6·2	2·6	"		0·3	12
Tambov-Saratov . . .		6·0	2·0	keros. and other petr. prod.		0·6	16
Fastov		5·2	1·2	salt		0·6	16
Samara-Zlatoust . . .		1·9	0·5	"		0·6	3
Shuya-Ivanov		1·8	0·2	wood fuel		0·5	10
Novotorzhsk		1·6	0·9	" "		0·1	65
Tambov-Kozlov		1·3	0·4	keros. and other petr. prod.		0·1	20
Baskunchak		1·0	0·0	salt		0·6	11
Lodz		1·0	0·1	coal		0·7	42
		Millions.				Mill.	
Mitau.		668·3	162·5	timber		67·3	5
Pskov-Riga.		694·7	143·8	"		32·2	2
Novgorod		550·7	184·5	keros. and other petr. prod.		10·5	4
Murom		506·7	36·1	wood fuel		124·3	5
Livny		419·3	277·2	timber		33·9	7
Riga-Tukum		118·6	27·3	salt		154·8	2
Borovichi		63·2	8·9	wood		3·8	2
Tsarskoe Selo.		32·0	...			...	1
Oboyan. . . . .		...	...			...	...

From the results quoted it appears that upon 19 lines with a length of 10,983 versts, or 41 per cent of the total length of the railway system, the intensity of the goods traffic was higher than the average for the whole system, i. e. higher than 28·6 million pouds, viz.:

Nicholas	90 million pouds.
Warsaw-Vienna	68 " "
Novotorzhsk.	65 " "
Moscow-Riazan	64 " "

Moscow-Nizhni-Novgorod	50	million pouds.
Riazan-Kozlov	58	" "
Oriol-Vitebsk.	57	" "
Moscow-Kursk.	56	" "
Transcaucasian	55	" "
Oriol-Griazi	53	" "
Yekaterina	50	" "
Dvinsk-Vitebsk	48	" "
Griazi-Tsaritsyn	43	" "
Lodz	42	" "
Kursk-Kharkov-Azov	39	" "
South-western	38	" "
Riga-Dvinsk	32	" "
Moscow-Brest	31	" "
Kursk-Kiev	30	" "



THE INTERNAL WATER WAYS OF EUROPEAN RUSSIA.

I. Information relating to all the internal water ways.

W a y s.

In European Russia, exclusive of Finland and the Caucasus ¹, according to the latest information of the Ministry of Ways of Communication ², there are 604 rivers, 31 canals, and 50 lakes, upon which raftage or navigation take place. Their total extent amounts to: rivers, 96,555 versts; canals, 754 versts; and lakes, their principal navigable lines only, 738 versts; or a total of 98,047 versts. In this number are included: a. navigable portions, 33,716 versts, b. raftable, 34,044 versts; and c. unraftable, forming the upper reaches of the rivers, 30,287 versts. Thus, the *water ways proper*, navigable and raftable, amount to 67,760 versts, among which artificial navigations, canals and the locks on rivers, form 1,733 versts. There are 20,500 versts of navigations upon which steam communication exists.

There is one verst of the 67,760 versts of navigable and raftable ways to 65 square versts of area, and to 1,382 inhabitants of both sexes of European Russia, exclusive of Finland and the Caucasus.

The total extent of the navigable and raftable ways is divided *among the sea basins* in the following manner:

¹ In the Caucasus there are 822 versts of navigable and 986 versts of raftable communications.

² List of the internal water ways of European Russia. Published by the statistical section of the Ministry of Ways of Communication, 1892.

³ As navigable are reckoned ways over which navigation occurs in either direction, as raftable, those by which floating only of every kind of vessel and of timber in rafts or free takes place.

Sea basins:	Navi- gable.	Raft- table.	Total.
	V e r s t s.		
Caspian Sea	13,451	13,911	27,362
Baltic	6,814	9,884	16,698
Black Sea and Sea of Azov . .	7,749	6,756	14,505
Arctic Ocean and White Sea . .	5,597	3,493	9,090
Total . . .	33,611 ¹	34,044	67,655 ¹

Thus, the most considerable system, as far as extent is concerned, is presented by the water ways of the Caspian basin, forming as much as 41 per cent of the whole; next follow those of the Baltic basin, 25 per cent, the Black Sea and Azov basins 21 per cent, and lastly the water ways of the Arctic Ocean and White Sea, 13 per cent.

The River Fleet.

In Russia the first steamer was built in 1813 in St.Petersburg, by the ship-builder Baird, who received in 1817 a seventyfive years privilege for the construction of steam ships. Up to 1843, i. e. the termination of the period of this privilege, when the right was granted of the free establishment of steam communication over the rivers of the Empire, the internal water ways of Russia reckoned only about 15 steamers, sailing on the river Neva and, in the basin of the Caspian Sea, upon the Volga, Kama and Oka. The data quoted below on the number of **steam vessels** and their nominal horse-power give an idea of the development of steamtraffic over the internal water ways of European Russia from the fifties to the present time.

Y E A R:	Steam vessels.	Nominal horse-power.
1852	83	7,229
1860	392	26,542
1870	656	47,540
1880	898	63,758
1890	1,824	103,176

In 1860 as compared with 1852, the number of steamers sailing had increased by 309, which makes an average of 39 steamers a year; in 1870 compared with 1860, by 260, or 26 per annum; in 1880 compared with 1870, by 446, or 45 per annum; and in 1890 compared with 1880, by 926, or 93 per annum.

The employment and description of the river steam vessels now sailing, according to the return of 1890, are given in the following data:

¹ Over and above this, extent the of the dead dividing waters of the artificial systems is 105 versts.

Steam vessels:	Totals.	Iron.	Paddle.	Screw.	Nominal H.—P.	Tonnage, pouds.
Passenger	248	232	199	49	11,283	773,137
Freight and Passenger .	179	162	155	24	15,782	1,731,862
Freight	80	74	9	71	5,026	2,727,600
Tug and Passenger . .	162	135	136	26	7,693	579,709
Tug	989	817	726	263	58,346	3,108,641
Tuer or chain	26	26	26	—	1,115	25,200
Service	140	117	46	94	3,928	276,160
Total . . .	1,824	1,563	1,297	527	103,176	9,222,309

The above steam vessels use for heating: 573, wood fuel; 553, coal; and 688, petroleum waste. The consumption of all these vessels, according to the data of 1890, in the course of the navigation was as follows: wood fuel, 223,469 cub. sages; coal, 17,264,263 pouds; and petroleum waste, 35,113,000 pouds. Converting the above mentioned kinds of fuel, in accordance with their heating capacity, into cubic sages of wood fuel, assuming as equivalent to one cubic sage 108.72 pouds of coal and 70.53 pouds of petroleum waste, the result is obtained of about 880,110 cubic sages of wood fuel; in this quantity the share of wood fuel is 25 per cent, of coal 18 per cent, and of petroleum waste 57 per cent.

The data upon the building of river **craft other than steam vessels** in European Russia during 1865 — 1888 are as follows:

Years.	During each period.		Average per annum.		Average cost per vessel. roub.
	Vessels.	Cost, thous. roub.	Vessels.	Cost. thous. roub.	
1865 — 1869	53,513	20,260	10,703	4,052	379
1870 — 1874	43,448	18,251	8,689	3,650	420
1875 — 1879	39,239	22,332	7,847	4,466	569
1880 — 1884	34,009	26,418	6,802	5,284	777
1885 — 1888	24,902	21,076	6,225	5,269	846

The data given above indicate that the number of vessels being built is gradually diminishing, and their cost notably increasing. The average annual number of vessels built in the last four-yearly period was less than that for the quinquennial period: 1880—1884, 8.5 per cent; 1875—1879, by 21 per cent; 1870—1874, by 28 per cent; 1865—1869, by 42 per cent. On the contrary, the average cost per vessel for the same period compared with the four quinquennial periods mentioned increased: by 9, 49, 106 and 123 per cent. The diminution during the last few years in the number of vessels under

construction is explained by the considerable development over the internal water ways of steam traffic in general and especially of steam tugs, the latter enabling vessels having recourse to this method of traction to accomplish during the navigation a greater number of passages and consequently to convey larger amount of freight, than with employment of other systems of hauling. The development of steam tugging has also caused an increase in the cost of the ships built, as steam tugging demanded the building of vessels of a more solid construction, and consequently costing more.

The total number of vessels other than steamers in European Russia according to the return of 1890, was 20,125.

The number and description of the whole of the river fleet according to the return of 1890, appear from the following data:

	Steam.	Other.	TOTAL.
Vessels	1,824	20,125	21,949
Iron	1,563	241	1,804
Wooden	261	19,884	20,145
Tonnage, pouds	9,222,309	401,248,595	410,470,904
Cost of construction, roubles. .	75,576,603	38,324,852	113,901,455
Permanent crews	25,814	90,356	116,170

Conveyance of freights.

In presenting the data upon the conveyance of freights over the internal water ways, i. e. upon the kind and, mainly, the quantity of freight conveyed in vessels and in rafts, it is necessary to explain that this branch of statistics does not give definite and exact data. An exact estimation of such freights, in consequence of the great variety in types of river craft and the nature of the timber floated in rafts, presents considerable difficulties. Further in Russia the estimation of the freights conveyed over the internal water ways is intimately connected with the ship dues levied in favour of the treasury, for the determination of the amount of which are ascertained the kind, quantity and value of the freight conveyed, the basis for the same being mainly the declarations of the persons paying the dues. In consequence of this it must be acknowledged that on the whole the returns on the quantity of freights conveyed are below the truth.

Upon the basis of the data supplied by the local organs of the Ministry of Ways of Communication, there was loaded (conveyed) over all the internal water ways:

Year.	Vessels.	Rafts ¹ .	TOTAL.
	Thousand pouds.		
1881.	429,036	465,037	894,073
1882.	476,028	428,885	904,913
1883.	473,635	389,131	862,766

Year.	Vessels.	Rafts ¹ .	TOTAL.
	Thousand		pounds.
1884	487,332	316,334	803,666
1885	507,880	306,032	813,912
1886	538,447	349,010	887,457
1887	557,659	363,606	921,265
1888	565,620	485,765	1,051,385
1889	595,914	549,102	1,145,016
1890	596,716	506,597	1,103,313

On an average for the above decennial period out of the total quantity of freights there was conveyed: in vessels, 523,000,000 pounds, or 56 per cent; in rafts, 416,000,000 pounds, or 44 per cent; or a total of as much as 939,000,000 pounds annually. During the five years 1886—1890, compared with the five years 1881—1885, the traffic increased: freights in vessels, by 20 per cent; freights in rafts, by 18 per cent; or by a total of 19 per cent.

The kind and quantity of traffic over the internal water ways of the principal goods are given by the following figures:

G O O D S.	1888.	1889.	1890.
	Millions pounds.		
Wheat	48.5	52.6	48.9
Wheaten flour.	9.1	8.7	8.4
Rye	39.6	31.7	23.0
Rye flour	17.1	23.3	24.0
Oats	32.7	27.6	27.3
Barley	8.9	7.5	6.5
<hr/>			
Total of six chief breadstuffs .	155.9	151.4	138.1
Salt	21.6	24.5	23.5
Petroleum and petroleum waste .	30.7	42.4	44.3
Kerosene and other petroleum products	15.2	18.7	18.1
Coal	3.2	3.6	3.9
Timber and wood fuel . . .	673.5	736.7	692.9
Other freights ²)	151.3	167.7	182.5
<hr/>			
Total . . .	1,051.4	1,145.0	1,103.3

¹ Data upon the weight of the rafts have only been gathered since 1888; in former years these data were calculated upon the basis of the average weight of a raft for 1888—1890 for each river basin separately, and the number of rafts loading in it in the corresponding years.

² Among the other freights not named the chief in reference to the amount conveyed according to the return for 1890, are: meal of all kinds, 9,000,000 pounds; maize, 3,000,000 pounds; linseed, 8,000,000 pounds; cast iron and unmanufactured iron, 20,000,000 pounds; fish, 13,000,000 pounds; and building materials, not timber, over 50,000,000 pounds.

The quantity of the above named goods, compared with the total amount of traffic over the internal water ways, form on an average for the years in question: breadstuffs, 13·6 per cent; salt, 2·2 per cent, petroleum and petroleum waste, 3·5 per cent; kerosene and other petroleum products, 1·5 per cent; coal, 0·3 per cent; and timber and wood-fuel, 63·7 per cent. Thus, all these wares together comprise about 85 per cent of the total traffic on the internal water ways.

II. Information having reference to the separate river basins.

I. Basin of the Volga.

Ways.

The total length of the navigable and raftable ways of the basin of the Volga amounts to 26,452 versts, of which the navigable portions form 13,451 versts and the raftable 13,001 versts. Steam navigation takes place in the basin on a length of 9,843 versts. The chief tributaries of the Volga are the rivers Kama and Oka, forming with their tributaries considerable river basins; the total extent of the navigable and raftable ways of the basin of the Kama is 10,587 versts, and of the Oka, 4,435 versts.

The following rivers of the basin of the Volga have each a total length of above 500 versts:

	Total length.	Navigable portion	Raftable portion.
	V e r s t s.		
Volga	3,458	3,344	114
Kama	1,764	1,139	508
Oka	1,425	1,333	—
Bielaya	1,287	465	801
Viatka	1,122	713	335
Sura	810	606	105
Ufa	786	—	731
Chusovaya	728	368	208
Vietluga	712	592	—
Kliazma	587	398	—
Moksha	562	387	—
Mologa	544	225	—
Sylva	539	158	74
Great Irgiz	533	259	183

The time of the opening and closing of the navigation and the duration of the spring and autumn ice drifts and of the navigation season in the basin of the Volga are given in the following table, which shows the average data for 1882—1891 at the stations of observation.

Ways and stations of observation.	Opening.		Closing.		D u r a t i o n.			
	First movement office.	Final clearing of river.	First ap- pearance of thin ice.	Final setting office.	Spring ice drift.	Naviga- tion se- ason ¹ .	Autumn ice drift.	
					D	a	y	s.
<i>Volga.</i>								
Tver	Mar. 27	Apr. 1	Oct. 26	Nov. 13	5	208	18	
Kaliazin	" 28	" 3	" 28	" 14	6	203	24	
Rybinsk	" 30	" 7	" 23	" 10	8	199	18	
Yaroslavl	" 31	" 8	" 24	" 9	8	199	16	
Kostroma	Apr. 1	" 7	" 24	" 7	6	200	14	
Nizhni-Novgorod	" 1	" 12	" 25	" 23	11	196	29	
Vasilsursk	Mar. 31	" 10	" 24	" 17	10	197	24	
Mouth of Kama	Apr. 3	" 10	" 25	" 18	7	198	24	
Simbirsk	" 2	" 15	" 26	" 27	13	194	32	
Samara	" 1	" 14	" 29	" 30	13	198	32	
Syzran	" 3	" 13	" 27	" 30	10	197	34	
Saratov	Mar. 30	" 14	Nov. 3	Dec. 8	15	203	35	
Kamyshin	" 29	" 12	" 5	" 9	14	207	34	
Tsaritsyn	" 22	" 10	" 5	" 5	19	209	30	
Yenotaevsk	" 15	Mar. 23	" 28	" 4	8	250	6	
Astrakhan	" 5	" 11	" 25	" 10	6	259	15	
<i>Kama.</i>								
Berezniaki, vill. . . .	Apr. 18	Apr. 26	Oct. 12	Oct. 29	8	169	17	
Perm	" 13	" 23	" 14	" 30	10	174	16	
Osa	" 13	" 23	" 15	" 30	10	175	15	
Sarapul	" 11	" 22	" 17	Nov. 1	11	178	16	
Yelabuga	" 9	" 17	" 19	" 1	8	185	13	
Laishev	" 8	" 16	" 22	" 4	8	189	13	
<i>Viatka.</i>								
Viatka	" 10	" 14	" 20	Oct. 29	4	189	9	
Kotelnich	" 8	" 16	" 16	" 28	8	183	12	
Mamadysh	" 5	" 12	" 21	Nov. 6	7	192	16	
<i>Bielaya.</i>								
Ufa	" 5	" 13	" 19	" 4	8	189	16	
Birsk	" 5	" 13	" 20	" 2	8	190	13	
Gruzdevsk, whf.. . .	" 5	" 14	" 20	Oct. 29	9	189	7	

¹ Between the final clearing of the way from ice in spring and the first appearance of thin ice in autumn.

Ways and stations of observation.	Opening.		Closing.		Duration.		
	First mo- vement of ice.	Final cle- aring of river.	First ap- pearance of thin ice.	Final set- ting of ice.	Spring ice drift. D	Naviga- tion season. a y	Autumn ice drift. s.
<i>Chusovaya.</i>							
Revda, works .	Apr. 13	Apr. 16	Oct. 12	Oct. 18	3	179	6
Ilmsk, whf . .	" 12	" 17	" 11	" 20	5	177	9
Chusovaya, dep.	" 14	" 20	" 14	" 25	6	177	11
<i>Sura.</i>							
Penza	Mar. 25	" 1	" 22	Nov. 3	6	204	12
Promzino, vill. .	" 23	Mar. 31	" 22	" 13	8	205	22
<i>Oka.</i>							
Oriol	" 15	" 23	" 24	" 17	8	214	24
Kaluga	" 18	" 30	" 28	" 20	12	212	23
Kashira	" 22	" 31	" 27	" 19	9	210	23
Riazan	" 26	Apr. 2	Nov. 5	" 13	7	217	8
Kasimov	" 29	" 4	Oct. 29	" 7	6	208	9
Murom	" 27	" 4	" 28	" 10	8	207	13
Nizhni-Novgorod	" 30	" 5	" 27	" 11	6	205	25

The least and greatest duration of the spring and autumn ice drifts and of the navigation season on the separate rivers are as follows:

		Spring ice drift. D	Autumn ice drift. a y	Season of navigation. s.
Volga:		from — to	from — to	from — to
Between Tver and Rybinsk . .		5 — 8	18 — 24	199 — 208
" Rybinsk and Nizhni-Novgorod		6 — 11	14 — 29	196 — 200
" Nizhni - Novgorod and mouth of Kama . .		7 — 10	24	197 — 198
" mouth of Kama and Samara		13	32	194 — 198
" Samara and Saratov . .		10 — 15	34 — 35	197 — 203
" Saratov and Tsaritsyn .		14 — 19	30 — 34	207 — 209
" Tsaritsyn and Astrakhan		6 — 8	6 — 15	250 — 259
Kama		8 — 11	13 — 17	169 — 189
Viatka		4 — 8	9 — 16	183 — 192
Bielaya		8 — 9	7 — 16	189 — 190
Chusovaya		3 — 6	6 — 11	177 — 179
Sura		6 — 8	12 — 22	204 — 205
Oka		6 — 12	8 — 25	205 — 217

Fleet of the basin of the Volga in 1890.

a. Steam vessels.

	Total vessels.	Iron.	Paddle.	Screw.	Nominal Total.	H.-P. Per vessel.	Total tonnage. Thous. pouds.	Total cost. Thous. roubles.
Passenger . . .	84	74	69	15	5,061	62	347	4,110
Freight and pass.	109	95	108	1	11,247	103	1,104	10,143
Freight	14	11	6	8	1,145	82	579	1,653
Tug and pass. .	67	52	57	10	3,840	57	305	2,560
Tug.	646	503	570	76	45,254	70	2,504	26,563
Chain tug . .	24	24	24	—	1,035	43	24	1,023
Service	71	59	24	47	1,109	16	69	1,033
Total . . .	1,015	818	858	157	68,691	68	4,932	47,085

The steam vessels navigating the basin of the Volga use for heating: 300 vessels, wood fuel; 30, coal; and 685 vessels, petroleum waste. The total quantity consumed by these vessels during the season of 1890 was: wood fuel, 145,664 cub. sagues; coal, 485,700 pouds; and petroleum waste, 85,038,542 pouds.

b. Craft other than steamers.

	Totals.	Decked.	Open.	Length.		Breadth.		Average draught, laden.	Total tonnage	Total cost.
				Average.	Greatest.	Average.	Greatest.		Ths. pouds.	Ths. roub.
Barges . . .	2,503	2,381	122	31·3	57·2	4·8	7·0	12·2	150,438	17,061
Barks	640	77	563	23·7	35·2	5·1	8·3	6·9	15,820	615
Belianas . .	97	—	97	31·3	45·0	8·5	11·0	18·0	15,142	320
Kolomenkas .	305	156	149	19·3	26·0	4·4	5·7	7·0	5,349	241
Boats	363	—	363	5·0	5·0	1·3	1·3	3·0	145	15
Wherries . .	247	3	244	21·2	27·3	5·9	7·3	5·3	4,718	173
Fishing boats.	248	92	156	6·3	8·5	2·5	2·8	8·3	917	74
Unzhaks . .	234	—	234	19·1	21·0	3·9	4·5	5·5	3,019	152
Others . . .	1,291	249	1,042	—	—	—	—	—	11,710	853
Total . . .	5,928	2,958	2,970	—	57·2	—	11·0	—	207,258	19,504

Conveyance of freights.

On all the ways of the Volga basin, there were loaded (forwarded):

Year.	Vessels.	Rafts.	Total
	T h o u s a n d s p o u n d s .		
1881	215,087	113,843	328,930
1882	241,709	96,011	337,720
1883	255,212	84,088	339,300
1884	269,986	69,001	338,987
1885	300,087	60,869	360,956
1886	313,366	82,623	395,989
1887	311,762	98,311	410,073
1888	310,768	157,374	468,142
1889	329,004	184,501	513,505
1890	326,626	190,987	517,613

On an average for the decennial period quoted, there were forwarded out of the total quantity of freights: in vessels, 287,000,000 pouds or 72 per cent; in rafts, 114,000,000 pouds or 28 per cent; or a total of 401,000,000 pouds. During the five-yearly period 1886—1890, compared with that of 1881—1885, the freights conveyed in vessels, increased by 24 per cent; in rafts by 68 per cent; and both together, by 35 per cent.

The kind and quantity of the traffic of the chief goods appear from the following data:

G o o d s .	1888.	1889.	1890.
	M i l l i o n p o u n d s .		
Wheat	23·0	23·3	23·2
Wheaten flour	8·0	7·5	7·3
Rye	23·3	12·0	8·7
Rye flour	15·0	21·0	21·9
Oats	25·4	21·0	21·7
Barley	0·6	0·5	0·3
Total of six chief breadstuffs. .	95·3	85·3	83·1
Salt	19·1	20·1	20·0
Petroleum und petrol. waste . .	30·1	41·7	43·7
Kerosene and other petr. products.	14·4	17·9	17·2
Coal	1·9	2·1	2·2
Timber and wood fuel.	206·5	243·6	247·0
Other freights	100·2	102·8	104·4 ¹
Total	467·5	513·5	517·6

¹ Among these the most important in reference to quantity conveyed in 1890 were: meal of all kinds, 7,000,000 pouds; linseed, 8,000,000 pouds; cast iron and unmanufactured iron, 18,000,000 pouds; fish, 10,000,000 pouds; and building materials not timber, over 10,000,000 pouds.

The wares named compared with the total quantity of traffic in the basin of the Volga formed on an average: breadstuffs, 17·6 per cent; salt, 3·9 per cent; petroleum and petroleum waste, 7·7 per cent; kerosene and other petroleum products, 3·3 per cent; coal, 0·4 per cent; and, timber and wood fuel, 46·5 per cent; or in all about 80 per cent of the total quantity of freights, forwarded from the wharves of the Volga basin.

The most important wharves in the Volga basin in reference to the quantity of freight forwarded in 1890.

1. Wharves, forwarding each total freights of above 5 millions pouds.

			Total in vessels and on rafts. Thous. pouds.
Astrakhan	on	Volga	78,444
Vetluga	"	Vetluga.	24,014
Samara	"	Volga	12,831
Nizhni-Novgorod	on	"	10,482
Chusovaya	on	Chusovaya	6,053
Berezniaki	"	Kama	5,915
Mikhalinino	"	Vetluga.	5,908
Kologriv	"	Unzha	5,898
Mologa	"	Volga	5,777
Balakovo	"	"	5,747
Saratov	"	"	5,728
Levshino	"	Chusovaya	5,492
Chistopol	"	Kama	5,376
Kizvy	"	Obva	5,012

The total freights loaded and forwarded from the wharves above mentioned amounted to about 183,000,000 pouds or 35 per cent. of the total traffic in the basin of the Volga.

2. Wharves, forwarding each individual kinds of goods, above one million pouds:

a. Wheat and wheaten flour together:

Samara	on	Volga . .	6,648	thous. pouds.
Balakovo	"	" . .	5,556	" "
Saratov	"	" .	1,902	" "
Rovnoe	"	" . .	1,506	" "
Kamyshin	"	" .	1,113	" "
Nizhni-Novgorod	on	" . .	1,080	" "

In all 18,000,000 pouds, or 71 per cent of total traffic.

b. Rye and rye flour together:

Chistopol	on	Kama	3,265	thous. pouds.
Samara	"	Volga	2,711	" "

Saratov on Volga	2,028	thous. pouds.
Berezhny Chelny on Kama	1,571	" "
Ufa on Bielaya	1,392	" "
Simbirsk on Volga	1,378	" "
Birsk on Bielaya	1,091	" "

In all over 13,000,000 pouds, or 43 per cent of total traffic.

c. Oats.

Kukarka on Pizhma	1,832	thous. pouds.
Medviedevka on Viatka	1,628	" "
Kotelnich " "	1,552	" "
Berezniki " Sura	1,137	" "
Tetiushy " Volga	1,000	" "

In all over 7,000,000 pouds, or about 31 per cent of total traffic

d. Salt.

	Thous. pouds.
Usolsk on Kama	4,894
Vladimir on Volga	4,377
Solikamsk " Usolka	3,226
Berezniaki " Kama	2,844
Tolstik " "	1,559
Lenva " "	1,000

In all about 18,000,000 pouds, or 90 per cent of the total traffic.

e. Petroleum, petroleum waste and petroleum products are forwarded from Baku, upon the Caspian Sea. About 60,000,000 pouds of these freights bound or the Volga passed in 1890 the Astrakhan wharves situated at the mouth of that rivers.

The most important wharves in the basin of the Volga in reference to the quantity of freights arriving at them are the following. They unloaded each in 1890 total freights of over 10,000,000 pouds.

	C h i e f g o o d s:				
	Total	Six chief	Salt.	Petroleum,	Timber
	freights.	bread-stuffs.		petr. waste and petr. products.	and wood fuel.
T h o u s a n d p o u d s.					
Nizhni Novgorod ¹ on Volga . .	60,931	8,372	5,258	16,972	10,706
Tsaritsyn " " . .	58,677	3	3,434	20,742	25,286
Rybinsk " " . .	37,434	19,123	1,965	341	3,415
Kazan " " . .	20,300	1,755	266	3,408	12,655

¹ At the Nizhni Novgorod wharf, besides the goods named, there arrived for the Nizhni Fair, by the river Volga a considerable quantity of cast iron, iron and steel unmanufactured, manufactured articles of the same, dry goods and apothecaries' goods, fruits, and other freights.

	C h i e f g o o d s :				
	Total freights.	Six chief bread- stuffs.	Salt.	Petroleum, petr. waste, and petr. products.	Timber and wood fuel.
	T h o u s a n d p o u n d .				
Yaroslavl on Volga	20,132	4,914	1,966	2,592	7,045
Saratov " "	19,165	1,225	1,135	5,144	8,834
Astrakhan " "	18,619	3,499	—	—	7,869
Moscow " Moskva	15,474	459	45	42	8,869
Tver " Volga	12,886	460	249	—	11,198
Total	263,618	39,810	13,318	49,241	95,877

Thus, the arrivals at the above named nine receiving points form: in reference to the total 51 per cent; to the six chief breadstuffs, 48 per cent; to salt, 66 per cent; to petroleum, petroleum waste and petroleum products, 81 per cent; and to timber and wood-fuel, about 40 per cent, of the whole traffic in these wares in the Volga basin.

A considerable part of the goods, mainly bread stuffs, loading in the Volga basin, on transshipment in Rybinsk into smaller vessels, passes by the Maria Navigation in the Neva basin for the most part to St.-Petersburg. According to the data for 1890, 54,000,000 pouds passed from the river Volga into the Neva basin.

Freights for breadstuffs during the navigation of 1892 ¹

Volga below Rybinsk.

	Raftage.	S t e a m - t u g s .	
		With stream.	Against stream.
	Per 1,000 pouds and 1 verst, kopecks.		
April	2—4	2—9	2—7
May	7	2—9	2—6
June	—	4	2—6
July	—	2—9	2—6
August	—	2	3—7
September	—	2—11	3—12
October	—	2—9	4—10

¹ Returns upon freights of breadstuffs were appointed to be made in 1891.

	Volga above Rybinsk.		Volga below Rybinsk, and Kama.
	Chain tugs.	Hauling by horses.	Steam tugs.
	Against stream.		
	Per 1,000 pouds and 1 verst, kopecks.		
April	—	—	2—10
May	8—12	13—17	2—12
June	12—13	10—13	3
July	12—15	16	4—8
August	—	—	6
September . .	18	18	4—7
October . . .	20	—	—

Oka.

	Raftage.		Steam tugs.		Hauling by horses.
			With stream.	Against stream.	With stream.
	Per 1,000 pouds and 1 verst, kopecks.				
April	9—12	—	—	—	—
May	—	10—15	—	—	14
June	—	7	—	—	15
July	—	—	15	—	—
August . . .	10—15	—	27—31	—	6—8
September . .	20—36	—	—	—	—
October . . .	16—33	—	—	—	—

2. Basin of the Neva with lakes Ladoga, Onega and Ilmen.

Ways.

The length of all the navigable and raftable ways of this basin is equal to 5,933 versts, of which navigable portions, 2,071 versts and raftable, 3,862 versts. The steam communication in this basin is carried on over a length of 1,048 versts.

The extent of the navigable and raftable ways belonging properly to the basins of the Neva and the above named lakes is:

	Navigable.	Raftable.	Total.
	V e r s t s.		
Basin of Neva proper	92	216	308
„ „ Lake Ladoga	1,334	1,547	2,881
„ „ „ Onega	192	108	300
„ „ „ Ilmen	453	1,991	2,444
	2,071	3,862	5,933

The average data for 1882—1891 on the time of the opening and closing of the navigation and upon the duration of the spring and autumn ice drifts and of the navigation season in the basin of the Neva and lakes, according to the stations of observation.

Ways and stations of observation.	Opening.		Closing.		Duration.				
	First move- ment of ice.	Final clearing of river.	First appear- ance of thin ice.	Final setting of ice.	Spring ice drift.	Navi- gation sea- son.	Autumn ice drift.		
	D	a	t	e	s.	D	a	y	s.
Basin of Neva.									
Neva.									
Rozhki, whf.	Mar. 29	Apr. 10	Nov. 6	Nov. 12	12	211	6		
Schlüsselburg	" 23	" 20	Oct. 8	" 30	28	187	36		
Basin of Lake Ladoga.									
Lake Ladoga.									
Sukho lighthouse	Apr. 15	May 2	Nov. 8	Dec. 17	17	191	39		
Volkhov.									
Novaya Ladoga	" 6	Apr. 8	" 3	Nov. 8	2	209	5		
Gostinopol, whf.	" 4	" 7	" 5	" 12	3	212	7		
Novgorod	Mar. 18	" 14	Oct. 25	" 14	27	194	20		
Sias.									
Kolchanovo, vill.	Apr. 1	" 9	" 27	" 7	8	207	11		
Tikhvinka.									
Gorelukha, vill.	Mar. 27	" 8	" 29	" 19	10	204	21		
Emperor Alexander I.'s Canal.									
Siaskie Riadki	Apr. 2	" 10	" 30	" 4	8	203	5		
Svir.									
Sermaksy, vill.	" 9	" 18	" 28	" 11	9	193	14		
Vazhiny, vill.	" 10	" 16	Nov. 5	" 15	6	203	10		
Voznesenie, vill.	Mar. 28	" 30	" 5	" 23	33	189	13		
Basin of Lake Onega.									
Lake Onega.									
Povenets	May 2	May 13	Oct. 20	" 12	11	160	23		
Petrozavodsk	Apr. 30	" 8	Nov. 15	" 30	9	190	15		
Onega Canal									
Chernye Peski, whf. . . .	" 5	Apr. 20	Oct. 8	" 2	15	171	25		

Ways and stations of observation.	O p e n i n g		C l o s i n g.		D u r a t i o n.				
	First move- ment of ice.	Final clearing of river.	First appear- ance of thin ice.	Final setting of ice.	Spring ice drift.	Navi- gation sea- son.	Au- tumn ice drift.		
	D	a	t	e	s.	D	a	y	s.
Vytegra.									
Vytegra, mth.	Apr. 12	Apr. 17	Oct. 17	Oct. 31	5	182	14		
Saint Sergi, lock.	" 1	" 10	" 21	Nov. 8	9	194	18		
Basin of Lake Ilmen.									
Shelon.									
Novgorod rwy bridge . . .	Mar. 29	" 2	" 2	" 8	4	205	14		
Polist.									
Staraya Russa	" 11	Mar. 30	Nov. 7	" 10	19	222	3		
Msta.									
Verebie, st. Nicholas rwy . .	" 31	Apr. 6	Oct. 29	" 13	7	205	15		
Poterpelits, whf.	Apr. 2	" 5	" 28	" 14	3	205	17		
Opechensk	Mar. 28	" 4	" 23	" 25	7	202	33		
Msta, lock.	" 27	" 10	" 27	" 6	14	200	10		

The longest and shortest duration of the spring and autumn ice drifts and of the navigation season in this basin on the different rivers are shewn in the following data.

	Spring ice drift.	Autumn ice drift.	Navigation season.	
	D	a	y	s.
	from — to	from — to	from — to	from — to
Neva	12—28	6—36	187—211	
Lake Ladoga	17	39	191	
Volkhov	2—27	5—20	194—212	
Sias	8	11	201	
Tikhvinka	10	21	204	
Emp. Alexander's Canal.	8	5	203	
Svir	6—33	10—14	189—203	
Lake Onega	9—11	15—23	160—190	
Onega Canal	15	25	171	
Vytegra	5—9	14—18	182—194	
Shelon	4	14	205	
Polist	19	3	222	
Msta	3—14	10—33	200—205	

*

Fleet of the basin of the Neva in 1890.

a. Steam vessels.

	Totals.	Iron.	Paddle.	Screw.	Nominal Total.	H. P. Per vessel.	Total. tonnage. Thous. pouds.	Total cost. Thous. roub.
Passenger	12	12	1	11	247·0	21	14	251
Freight and passeng.	20	20	9	11	1,548·0	77	106	1,153
Freight.	1	1	—	1	60·0	60	3	50
Tug and passenger.	7	7	4	3	211·0	30	16	129
Tug	164	159	38	126	5,938·0	36	297	2,922
Chain tug.	2	2	2	—	80·0	40	1	86
Service	13	13	7	6	370·5	28	14	314
Total. .	219	214	61	158	8,454·5	39	451	4,905

The steam vessels navigating the Neva basin use for heating their boilers: 100 vessels, wood fuel; and 119, coal. All these vessels together during the navigation season of 1890 consumed: wood fuel, 30,451 cu. sagenes.; and coal, 3,635,000 pouds.

b. Vessels other than steamers ¹.

	Totals.	Decked.	Open.	Average. Length.	Greatest. Length.	Average. Breadth.	Greatest. Breadth.	Average draught, loaded.	Totaltonnage. Thous. pouds.	Total cost. Thous. roub.
				S a g e n e s .				Chetv.		
Barks	1,096	42	1,054	17·8	20·0	4·0	4·7	7·2	16,879	219
Berlins	281	20	261	18·9	22·0	4·0	4·8	8·7	5,261	193
Boats	220	67	153	8·7	21·5	2·3	5·0	5·3	968	62
Marinkas	2,323	2	2,321	19·6	21·3	4·0	4·8	8·6	47,485	1,226
Half boats	2,241	289	1,952	19·5	21·3	3·9	4·8	8·5	47,172	3,165
Tikhvinkas.	653	21	632	10·3	20·3	2·2	4·0	5·8	3,370	192
Remaining types	928	164	764	—	—	—	—	—	10,441	571
Total .	7,742	605	7,137	—	—	—	—	—	131,576	5,628

Conveyance of freights.

Over all the ways of the Neva basin including lakes there were shipped (despatched).

	In vessels.	In rafts.	Total.
	T h o u s a n d p o u d s .		
1881	178,974	90,361	269,335
1882	167,037	91,726	258,763
1883	149,926	56,325	206,251
1884	140,846	36,553	177,399

¹ In the basin of the river Neva are included further all vessels other than steamers navigating the Maria, Tikhvin and Vyshni Volochok systems.

	In vessels. T h o u s a n d p o u d s.	In rafts.	T o t a l.
1885	130,017	45,349	175,366
1886	140,042	47,628	187,670
1887	138,176	50,468	188,644
1888	139,911	63,589	203,500
1889	147,883	59,044	206,927
1890	149,831	45,291	195,122

On an average for the decade quoted, of the total quantity of freights there were despatched: in vessels, 148,000,000 pouds or 71 per cent; in rafts, 59,000,000 pouds or 29 per cent; or a total of 207,000,000 pouds per annum. During the quinquennial period, 1886 to 1890, compared with that of 1881 to 1885, the shipments diminished: in vessels, by 7 per cent; in rafts, by 17 per cent; or by nearly 10 per cent of the total.

Kind and quantity of the principal goods despatched.

G o o d s :	1888. M i l l i o n p o u d s.	1889.	1890.
Wheat flour	0·09	0·08	0·06
Rye	0·05	1·00	0·02
Rye flour	0·76	0·80	0·49
Oats	2·90	2·70	2·18
Total of chief breadstuffs . . .	3·80	4·58	2·75
Timber and wood fuel	170·80	168·30	149·90
Building materials, except. timber .	27·60	26·80	29·26
Other freights.	1·30	7·24	3·21
T o t a l	203·50	206·92	195·12

The average despatch per annum of the said goods was: breadstuffs, 3·700,000 pouds; timber and wood fuel, 165·700,000 pouds; and building materials, except. timber, 27·900,000 pouds. These goods, in reference to the total quantity despatched, formed: breadstuffs, 2 per cent; timber, 81 per cent; and building materials, except. timber, 14 per cent; or a total of 97 per cent of the total despatched in the Neva basin including lakes.

In the basin of the Neva there are not, as in that of the Volga, extensive wharves, in which are concentrated a considerable shipping and despatch of goods. All the goods despatched in this basin are shipped from numerous small landing stages and various small tributaries despatching mainly timber and wood fuel. On the other hand the unloading of goods in this basin is concentrated mainly in one point, viz. St. Petersburg.

According to the data for 1888—1890 there arrived in St. Petersburg by internal water communication:

G o o d s :	1888. T h o u s a n d p o u d s.	1889.	1890.
Wheat	2,260	2,809	4,331
Wheat flour	472	779	1,246

¹ Besides this, freights are conveyed over the ways of the Neva basin which have been despatched from the Volga basin, 60,000,000 pouds per ann., and from the basin of the Northern Dvina, 3,090,000 pouds per annum.

G o o d s:	1888. T h o u s a n d	1889. p o u n d s.	1890.
Rye.	14,114	3,585	1,763
Rye flour	4,467	4,672	4,377
Oats	22,740	18,607	16,819
Barley	184	171	123
Meal of all kind	2,140	1,228	1,475
Total of chief breadstuffs . .	46,377	31,851	30,134
Linseed	5,349	5,525	2,193
Flax, codilla and flax waste . .	327	128	108
Cast iron and iron unmanu- factured	573	915	832
Salt.	579	931	276
Petroleum, petroleum waste and petroleum products	493	752	828
Wood fuel.	70,485	74,404	81,353
Timber	45,422	46,769	44,778
Hay and straw.	877	786	675
Charcoal	453	400	552
Building materials excl. timber .	27,572	26,785	29,259
Other goods	3,357	3,554	2,823
Total	201,864	192,800	193,809
Among which:			
From the basin of the Neva . .	137,111	140,784	144,535
" " " " " Volga . .	62,792	50,299	46,074
" " " " " N. Dvina	1,961	1,717	3,200

Thus on an average for the years mentioned there arrived in St. Petersburg by internal water communication 196,000,000 pouds per annum; of this quantity there arrived: from the Neva basin and lakes, 141,000,000 pouds or 72 per cent of the total arrivals; from that of the Volga, 53,000,000 pouds or 27 per cent; and from the basin of the Northern Dvina, 2,000,000 pouds or about 1 per cent. From the basin of the Volga are forwarded to St. Petersburg; breadstuffs, 91 per cent of total arrivals; linseed, 98 per cent; flax, codilla and flax waste, 57 per cent; timber, 9 per cent; and the whole arrivals of salt, cast iron, iron, petroleum and petroleum waste. From the basin of the Northern Dvina are forwarded to St. Petersburg; oats, about 4 per cent of the total arrivals; and timber, about 4 per cent. Further, all the rest of the above named goods is forwarded from the basin of the river Neva and lakes.

The data upon the freights for the transport of grain cargoes in the basin of the Neva are given below in the description of the Maria system.

3. Basin of the Northern Dvina.

W a y s.

The extent of all the navigable and raftable ways of this basin is equal to 9,089 versts, of which the navigable sections constitute 5,596 versts and the raftable, 3,493 versts. Steam navigation takes place in the basin, on a length of 2,467 versts.

The following most important rivers of this basin have each a complete length of above 300 versts:

	Complete length.	Navigable parts. V e r s t s.	Raftable parts.
Vychegda	1,051	934	—
Northern Dvina	690	690	—
Pinega	615	433	182
Sukhona	526	526	—
Vaga	482	353	88
Yug	400	312	—
Luza	390	—	318
Ustia	363	—	313
Vym	345	24	—
Sysola	340	242	—
Kubena	316	25	291

The average data for 1882 to 1891 on the time of the opening and closing of the navigation and upon the duration of the spring and autumn ice drifts and of the navigation season in the basin of the Northern Dvina, according to the stations of observation.

Ways and stations of observation.	Opening.		Closing.		Duration.	
	First move- ment of ice.	Final clearing of river.	First ap- pearance of thin ice.	Final set- ting of ice.	Spring ice drift.	Autumn ice drift.
Northern Dvina.						
Archangel.	apr. 27	may 2	okt. 16	okt. 29	5	167
Ust-Penega, vill	" 21	apr. 30	" 12	" 26	9	165
Koleg	" 18	" 27	" 17	" 28	9	173
Abramova, vill	" 15	" 21	" 13	nov. 2	6	175
Liabel	" 13	" 20	" 13	" 3	7	176
Sinega, vill	" 12	" 18	" 13	" 1	6	178
Vychegda.						
Solvychegodsk	18 " 28	" 9	" 26	okt. 10	164	17
Vologda.						
Vologda	2 " 11	" 12	" 28	" 9	184	16
Yug.						
All Saints, vill	8 " 15	" 16	" 29	" 7	184	13

Ways and stations of observation.	Opening.		Closing.		Duration.		
	First movement of ice.	Final clearing of river.	First appearance of thin ice.	Final setting of ice.	Spring ice drift.	Navigation season.	Autumn ice drift.
Sukhona.	D a t e s.				D a y s.		
Veliki Ustiug	Apr. 11	Apr. 17	Oct. 17	Oct. 27	6	183	10
Porog, vill.	" 9	" 14	" 17	Nov. 3	5	186	17
Berezova Slobodka, vill.	" 9	" 17	" 15	" 7	8	181	23
Totma	" 7	" 15	" 17	" 4	8	185	18
Naremy, vill.	" 9	" 14	" 19	Oct. 25	5	188	6
Znamenity, lock.	" 9	" 25	" 12	" 29	16	170	17

The least and greatest duration of the spring and autumn ice drifts and of the navigation season in this basin upon the separate rivers are shewn in the following data:

	Spring ice drift.	Autumn ice drift.	Navigation season.
	D from—to	a y from—to	s. from—to
Northern Dvina	5—9	11—21	165—178
Vychegda	10	17	164
Vologda	9	16	184
Yug	7	13	184
Sukhona	5—16	6—23	170—188

Fleet of the basin of the Northern Dvina in 1890.

a. Steam vessels.

					Nominal H. P.		Total tonnage.	Total cost.
	Totals.	Iron.	Paddle.	Screw.	Totals.	Per vessel.		
Passenger	6	6	5	1	275	46	26	280
Freight and passenger	11	9	6	5	660	60	143	597
Freight	1	1	—	1	70	70	11	65
Tug and passenger	23	17	20	3	1,015	44	64	739
Tug	29	19	16	13	724	25	57	388
Service	20	12	2	18	691	35	23	380
Total	90	64	49	41	3,435	38	324	2,449

The steam vessels navigating the basin of the Northern Dvina use in heating their boilers: 60 vessels, wood-fuel; and 30, coal. The total consumption by all these vessels during the navigation season of 1890 was: wood fuel, 20,745 cub. sages; and coal, 410,620 pounds.

b. Vessels other than steamers.

	Total.	Decked.	Open.	Length:		Breadth:		Average draught load- ed.	Total ton- nage.	Total cost.
				Average.	Greatest.	Average.	Greatest.			
				S	a	g	e	n	e	s.
									Chetv.	
									Thous. pouds.	Thous. roub.
Barges	146	91	55	21·8	40·0	4·8	5·0	8·2	3,154	467
Kayuks	414	216	198	16·3	19·0	3·9	4·5	8·8	6,086	135
Other types . .	350	43	307	—	—	—	—	—	3,259	144
Total .	910	350	560	—	—	—	—	—	12,499	746

Transport of freights.

By all the ways of the basin of the Northern Dvina there were loaded (despatched):

Year.	In vessels.	In rafts.	Totals.
	Thousand pouds.		
1881	7,749	6,109	13,858
1882	7,046	16,801	23,847
1883	7,287	9,441	16,728
1884	9,651	14,483	24,134
1885	8,650	16,040	24,690
1886	10,094	8,848	18,942
1887	9,563	10,677	20,240
1888	9,889	12,723	22,612
1889	10,215	10,680	20,895
1890	10,498	14,039	24,537

On an average for the decade quoted of the total quantity of freights there was despatched: in vessels, 9,000,000 pouds or 43 per cent; in rafts, 12,000,000 pouds or 51 per cent; or a total of 21,000,000 pouds per annum ¹. During the quinquennial period 1886—1890, compared with that of 1881—1885, the despatch of freights in vessels increased by almost 25¹ per cent, while that in rafts diminished by 9 per cent; the total despatsched increased by almost 4 per cent.

The kind and quantity of the chief goods despatched is shewn in the following data:

Goods:	1888.	1889.	1890.
	Million pouds.		
Wheat flour.	0·1	0·1	0·1
Rye	0·3	0·8	—
Rye flour	1·2	1·3	1·5
Oats	2·9	2·6	2·6
Total of chief breadstuffs .	4·5	4·8	4·2
Salt	0·2	0·2	0·1
Timber and wood fuel	15·9	13·5	16·0
Other freights	2·0	2·4	4·2
Total	22·6	20·9	24·5

¹ Besides this, freights are carried by the ways of the basin of the Northern Dvina, which have been despatched from the basin of the Volga, 2,000,000 pouds per annum.

The chief shipments in this basin, as appears from the data quoted, consist of timber and wood fuel, 65 per cent of the total despatched; and breadstuffs, 20 per cent.

The most important wharves in this basin are: for despatching: Vologda, upon the river of the same name, 2,900,000 pouds; Veliki Ustiug upon Sukhona, 1,600,000 pouds; for arrivals: Archangel upon Northern Dvina, 13,500,000 pouds; and Vologda, 3,600,000 pouds.

The freights for conveyance in the basin of the Northern Dvina of grain cargoes by steam tuggage with the stream in 1892 were in May, from 4 to 9 kopecks; in June, from 5 to 7 kopecks; and in July, 7 kopecks per 1,000 pouds and one verst.

4. Basin of the river Dnieper with the Southern Bug.

W a y s.

The extent of the navigable and raftable ways of the basin of the Dnieper and Southern Bug is equal to 9,091 versts, of which navigable sections, 4,300 and raftable, 4,791 versts. Steam communication in this basin takes place over a length of 3,209 versts.

The following rivers of this basin have each a complete length of above 500 versts:

	Complete length.	Navigable.	Raftable.
	V	e	s
Dnieper	2,117	1,867	76
Desna	911	640	229
Southern Bug . . .	713	130	—
Pripiat	699	471	147
Seim	573	54	404
Ingulets	538	146	—
Garyn	529	10	353
Sozh	504	332	—

The average data for 1882—1891 upon the time of the opening and closing of navigation and the duration of the spring and autumn ice drifts and of the navigation season in the basin of the Dnieper and Southern Bug according to the observation stations.

Ways and observation stations.	O p e n i n g.		C l o s i n g.		D u r a t i o n.		
	First move- ment of ice.	Final clear- ing of river.	First ap- pearance of thin ice.	Final set- ting of ice.	Spring ice drift.	Navi- gation season	Au- tumn ice drift.
Dnieper.						D a y s.	
Kherson	Febr. 21	Mar. 3	Dec. 6	Dec. 19	10	277	13
Kakhovka ham.	Mar. 4	" 8	Nov. 29	" 8	4	265	9
Nikopol	" 5	" 11	" 22	" 15	6	255	23
Kichkas, passage.	" 14	" 19	" 19	" 10	5	245	21
Lotsmanska Kamenka,vill.	" 12	" 18	" 14	" 13	6	240	29
Kremenchug	" 13	" 18	" 12	" 14	5	238	32
Cherkassy	" 13	" 19	" 15	" 13	6	240	28
Kiev	" 15	" 21	" 11	" 8	6	234	27

Ways and observation stations.	O p e n i n g.		C l o s i n g.		D u r a t i o n.				
	First move- ment office.	Final clear- ing of river.	First ap- pearance of thin ice.	Final set- ting of ice.	Spring ice drift.	Navi- gation season.	Au- tumn ice drift.		
Dnieper.					D a y s.				
Pripiat mouth	Mar. 16	Mar. 21	Nov. 11	Dec. 3	5	234	22		
Loev	" 18	" 25	" 12	Nov. 22	7	231	10		
Zhlobin, stn.	" 22	" 24	" 5	" 16	2	225	11		
Mihiliiov	" 17	" 27	" 5	" 17	10	222	12		
Orsha	" 17	" 27	" 10	" 21	10	227	11		
Smolensk.	" 20	" 29	" 9	" 29	9	214	20		
Dorogobuzh	" 20	" 30	" 4	" 20	10	219	16		
Desna.									
Chernigov	" 20	" 24	" 15	" 25	4	265	10		
Makoshino, vill.	" 21	" 26	" 11	" 17	5	229	6		
Golubeya, vill.	" 23	" 25	" 4	" 16	2	223	12		
Pripiat.									
Chernobyl	" 15	" 20	" 12	" 23	5	236	11		
Mozyr.	" 14	" 20	" 12	Dec. 4	6	236	22		
Korchma-Nirchy, vill.	" 14	" 18	" 12	Nov. 29	4	238	17		
Sozh.									
Gomel	" 20	" 24	" 11	" 22	4	231	11		
Berezina.									
Gorval, hám.	" 18	" 22	" 7	" 21	4	229	14		
Bobruisk	" 19	" 26	" 5	" 20	7	223	15		
Borisov, vill.	" 19	" 22	" 9	" 23	3	231	14		
Lock № 1	" 26	" 29	" 11	" 15	3	226	4		
Southern Boug.									
Kantakuzino, vill.	" 3	" 13	" 14	Dec. 8	10	245	24		

The least and greatest duration of the spring and autumn ice drifts and of the navigation season in this basin on the separate rivers is shewn in the following data.

	Spring ice drift.	Autumn. ice drift.	Navigation season.
	from—to	from—to	from—to.
Dnieper	2—10	9—32	219—277
Desna.	2—5	6—12	223—235
Pripiat.	4—6	11—22	236—238
Sozh	4	11	231
Berezina	3—7	4—15	223—231
Southern Bug	10	24	245

Upon the Dniepr between Lotsmanska Kamanka, 401 versts from the mouth, and the Kichkas passage, 325 versts from it, are considerable rapids, greatly impeding the raftage and making navigation absolutely impossible. In consequence of this, in the upper and lower parts of the basin of the Dnieper, separated by the rapids, there are special river craft, adapted to the local conditions of navigation.

Fleet of the basin of the Dnieper in 1890.

1. Basin of the Dnieper above the rapids.

a. Steam vessels.

	Totals.	Iron.	Pad- dle.	Screw.	Nominal H. P.: Total.	Per vessel.	Total ton- nage. Thous. pouds.	Total cost. Thous. roub.
Passenger	74	74	69	5	3,068	41	210	2,559
Freight and passenger	2	2	1	1	37	19	2	19
Tug and passenger	39	38	37	2	1,635	42	125	860
Tug	7	7	7	—	470	67	18	303
Service	9	9	3	6	166	19	5	136
Total	131	130	117	14	5,376	41	360	3,877

The steam vessels navigating the basin of the Dnieper above the rapids use for heating their boilers: 75 vessels, wood fuel; and 56, coal. The total consumption by these vessels was: wood fuel, 18,951 cub. sagues; and coal, 1,994,740 pouds.

b. Vessels other than steamers.

	Totals.	Decked.	Open.	Length:		Breadth:		Average draught, load- ed.	Total ton- nage.	Total cost.
				Average.	Greatest.	Average.	Greatest.	Chetv.	Thous. pouds.	Thous. roub.
				S a g e n e s.						
Barks	91	—	91	21·1	28·0	7·6	9·3	9·7	3,740	155
Berlins	614	481	133	16·0	30·0	3·0	5·2	6·5	7,491	982
Laibas	86	15	71	10·0	15·6	1·7	2·2	5·3	180	26
Other types . . .	143	18	125	—	—	—	—	—	2,391	209
Total	934	514	420	—	—	—	—	—	13,802	1,372

2. Basin of the Dnieper below the rapids with the Southern Bug.

a. Steam vessels

	Total.	Iron.	Pad- dle.	Screw.	Nominal H.P.:		Total tonnage.	Total cost.
					Total.	Per vessel.	Thous. pouds.	Thous. roub.
Passenger	16	14	11	5	1,344	84	104	1,561
Freight and passenger	9	8	8	1	244	27	28	238
Freight	11	11	—	11	942	86	515	1,322
Tug and passenger	14	11	9	5	437	31	32	345
Tug	38	32	26	12	1,988	52	79	1,666
Service	15	14	3	12	1,420	95	160	2,042
Total	103	90	57	46	6,375	62	918	7,174

The steam vessels navigating the basin of the Dnieper below the rapids and the Southern Bug use for heating their boilers: 5 vessels, wood fuel; 96, coal; and 2, petroleum waste. The total consumption by these vessels, during the navigation season of 1890 was: wood fuel, 2,530 cu. sagesnes; coal, 3,524,642 pouds; and petroleum waste, 62,500 pouds.

b. Vessels other than steamers.

	Length: Breadth:												
	Totals.	Decked.	Open.	Average.	Greatest.	Average.	Greatest	Average draught, loaded.	Total tonnage.	Total cost.			
				S	a	g	e	n	e	s.	Chetv.	Thous. pounds.	Thous. roub.
Barks	220	217	3	18·9	28·5	3·9	5·6	11·6	5,424	2,912			
Dubs	145	135	10	7·3	10·0	2·3	3·3	8·4	508	145			
Trenbaks	211	211	—	9·6	12·0	2·8	3·4	11·7	1,245	591			
Schooners	109	109	—	11·6	19·2	2·3	3·6	15·7	1,199	817			
Other types	195	152	43	—	—	—	—	—	2,460	984			
Total	880	824	56	—	—	—	—	—	10,836	5,449			

Transport of freights.

By all the ways of the basin of the Dnieper, without the Southern Bug, there were loaded (despatched):

Year.	In vessels.	In rafts.	Total.
	T h o u s a n d p o u n d s .		
1881	21,020	120,311	141,331
1882	34,992	104,760	139,752
1883	34,489	113,292	147,781

Year.	In vessels Thousand	In rafts pounds.	Total.
1884	34,186	89,186	123,372
1885	38,336	83,738	122,074
1886	40,811	96,286	137,097
1887	57,951	89,442	147,393
1888	60,666	93,399	154,065
1889	69,180	120,108	189,288
1890	64,858	98,081	162,939

On an average for the decade quoted out of the total freights in this basin there were despatched: in vessels, 46,000,000 pouds or 31 per cent; in rafts, 100,000,000 pouds or 69 per cent; or a total of 146,000,000 pouds per annum. During the quinquennial period 1886—1890, compared with that of 1881—1885, the despatch of freights in vessels increased by almost 80 per cent, while that in rafts diminished by 3 per cent; the total despatched increased by almost 8 per cent.

The kind and quantity of the chiefs goods despatched in the basin of the Dnieper is shewn in the following data:

G o o d s:	1888.	1889.	1890.
	Million pouds.		
Wheat	14·5	17·6	14·7
Wheat flour	0·8	0·9	0·9
Rye	9·9	14·5	8·5
Rye flour	0·1	0·1	0·1
Oats	0·9	0·3	0·2
Barley	6·9	6·2	5·5
Total of the six chief breadstuffs	33·1	39·6	29·9
Salt	1·8	2·8	2·8
Coal	0·5	0·6	1·0
Timber and wood fuel . .	106·9	133·6	114·0
Other freights.	11·7	12·7	14·1
Total . . .	154·0	189·3	162·9

The said goods in relation to the total quantity despatched in the basin of the Dnieper, constitute on an average: breadstuffs, 20 per cent; salt, 2 per cent; and timber and wood fuel, 70 per cent; or in all 92 per cent of the total despatched in this basin.

The principal shipment of grain in the basin of the Dnieper takes place from the wharves of the Dnieper, lying below the rapids. From this section the total shipment of the grain freights mentioned was: in 1888, 25,000,000 pouds; in 1889, 33,000,000 pouds; in 1890, 24,000,000 pouds; or a total of 82,000,000 pouds or 80,000,000 per cent of the grain despatched in all the basin of the Dnieper.

The most important wharves in the basin of the Dnieper in respect to the quantity of freights despatched in 1890.

1. Wharves despatching each a total of over 5,000,000 pouds of freights:

	Total in vessels and rafts. thous. pouds.
Propoisk, upon Sozh	10,247
Kherson, " Dniepr, below rapids	7,179
Alexandrovsk upon Dniepr, below rapids . .	7,076
Nikopol " " " "	6,522
Rogachevsk " " above "	4,519
Yekaterinoslav " " " "	4,352
Kakhovka " " below "	4,280
Svisloch " Berezina	3,179
Krichev " Sozh	3,080

From the said wharves is despatched a total of over 50,000,000 pouds or about 31 per cent of the total shipments in the basin of the Dnieper.

2. Wharves, despatching each over one million pouds of separate kinds of goods:

a. Wheat and wheat flour taken together.

	thous. pouds.
Nikopol, upon Dnieper below rapids	3,735
Alexander, " " " "	3,287
Kakhovka " " " "	1,523
Novo-Vorontsov, upon Dnieper below rapids . .	1,293

The total despatched from four wharves is 9,800,000 pouds or about 63 per cent of the total shipment of this grain in the basin.

b. Rye and rye flour taken together.

	thous. pouds.
Alexandrovsk, upon Dnieper below rapids. . .	1,698
Kakhovka, " " " "	1,549
Nikopol, " " " "	1,322

The total despatched from these wharves is 4,600,000 pouds or about 54 per cent of the total shipment of this grain.

c. Barley.

	thous. pouds.
Alexandrovsk, upon Dnieper below rapids . .	1,639
Nikopol, " " " "	1,168

The total despatched from two wharves is 2,800,000 pouds or about 51 per cent of the total shipment of this grain.

d. Of salt there were despatched in 1890 from the Yekaterinoslav wharf upon the Dnieper 2,500,000 pouds, which constitutes 90 per cent of the total shipment in this basin.

The principal wharves in the basin of the Dnieper in reference to the quantity of freights arriving are the following, at each of which in 1890 were unloaded over 10,000,000 pouds:

	Total freights.	Six chief breadstuffs.	Timber and wood fuel.
	T h o u s a n d p o u d s.		
Kherson, upon Dnieper, below rapids ¹ . .	37,311	23,873	9,987
Kiev, " " above " . .	16,689	1,395	12,684
Yekaterinoslav upon Dnieper above rapids .	14,723	2,485	11,899
Kremenchug " " " " .	11,939	369	10,962

The arrivals at the said four receiving points form: of the total, 49 per cent; of the breadstuffs, 94 per cent; and of the timber and wood fuel, 40 per cent of all the shipments in the basin of the Dnieper.

In considerable quantity of timber, principally in rafts, is despatched from the basin of the Dnieper, by the Berezina system to the Western Dvina, by the Oginsky system to the Nieman, and by the Dnieper Bug system to the Vistula. By the Western Dvina timber is rafted mainly to Riga, by the rivers Nieman and Vistula to Prussia. According to the approximate data for 1890, the shipment of timber in rafts from the Dnieper to the Western Dvina was 4,000,000 pouds, to the Nieman 12,000,000 pouds, and to the Vistula 20,000,000 pouds.

Registration of information upon the transport of freights was instituted upon the Southern Bug only in 1890, and therefore the data upon the transport by this river are quoted for 1891.

The total loaded at the wharves of the Southern Bug and its tributary the Ingul in 1891 was 11,350,000 pouds of various freights, conveyed exclusively in ships. The chief articles conveyed by the Southern Bug were: wheat, 3,900,000 pouds; rye, 1,500,000 pouds; and barley, 2,000,000 pouds; or a total of the chief grains of 7,590,000 pouds; about 66 per cent of the total traffic. The most important loading point upon the Southern Bug is the Voznesenie wharf, whence in the year mentioned there were despatched 6,400,000 pouds, or about 57 per cent of the total shipment. The most important unloading point is Nikolaev, where in the same year there arrived 9,700,000 pouds or about 86 per cent, of the total shipment of the basin of the Southern Bug.

Freights for grain cargoes during the navigation season of 1892.

¹. At the Kherson wharf only an inconsiderable part of the freights arriving by the Dnieper is unloaded, the greater number passing Kherson, principally for Odessa.

Dnieper above rapids.

	Steam tug traction against stream. Per 1,000 pouds and per verst. kopecks.
April	7 — 16
May	5 — 24
June	5 — 19
July	6 — 21
August	10 — 28
September	9 — 36
October	15 — 36
November	7 — 36

Dnieper below rapids and Black Sea to Odessa.

	Raftage. Per 1,000 pouds and per verst. kopecks.	Steam tug traction.
April	6 — 7	8 — 9
May	6 — 8	7 — 9
June	6 — 7	8 — 10
July	9 — 11	9 — 10
August	11 — 14	9 — 11
September	11 — 18	10 — 16
October	13 — 19	11 — 25
November	—	12 — 28
December	—	—

Southern Bug above Nikolaev.

	Sailing. Per 1,000 pouds and per verst. kopecks.	Steam tug traction. With stream.
May	14	—
July	—	19 — 22
August	14 — 24	19 — 22
September	22	19 — 33
October	24	19 — 26
November	23 — 26	26

5. Basin of the Western Dvina.

Ways.

The extent of the navigable and raftable ways of the basin of the Western Dvina is equal to 3,422 versts, of which navigable sections, 1,357 versts and raftable, 2,085 versts. Steamship communication is carried on over a length of 113 versts. The principal way of this basin is the Western Dvina, with a total length of 895 versts, of which navigable 834 versts, and raftable 61 versts. The largest tributary of the Western Dvina is the Mezha, whose total length is equal to 207 versts. All the remaining rivers of this basin are of considerably less length.

The average data for 1882—1891 upon the time of the opening and closing of the navigation and upon the duration of the spring and autumn ice drifts and of the navigation season in the basin of the Western Dvina according to the observation stations.

Ways and observation stations.	O p e n i n g.		C l o s i n g.		D u r a t i o n.		
	First movement of ice.	Final clearing of river.	First appearance of thin ice.	Final setting of ice.	Spring ice drift.	Navigation season.	Autumn ice drift.
Western Dvina.		D	a	y	s.		
Riga	Mar. 22	Mar. 29	Nov. 10	Nov. 23	7	226	13
Fridrichstadt . .	" 21	" 28	" 11	" 26	7	228	15
Menkenhof, ham	" 22	" 29	" 9	" 22	7	225	13
Dvinsk	" 19	" 26	" 9	" 30	7	228	—
Druya, ham . .	" 20	" 27	" 7	" 22	7	225	15
Ulla " . .	" 22	" 30	" 4	" 19	8	219	15
Vitebsk	" 22	" 30	" 1	" 27	8	216	26
Surazh.	" 26	Apr. 3	" 4	" 18	8	215	14
Ust-Goriany, vill.	" 25	" 2	Oct. 28	" 19	8	209	22

Ulla.

Half-lock № XIV	" 18	Mar. 24	Nov. 5	" 17	6	226	12
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Lake-Lepel.

Half-lock № XII	" 31	Apr. 5	" 11	" 23	5	220	12
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The least and greatest duration of the spring and autumn ice drifts and of the navigation season in the basin of the Western Dvina upon the separate rivers is shewn in the following data:

	Spring ice drift.	Autumn ice drift.	Navigation season.
	D from—to	a y s. from—to	s. from—to
Western Dvina	7 — 8	13 — 26	209 — 228
Ulla	6	12	226
Lake Lepel	5	12	220

Fleet of the basin of the Western Dvina in 1890.

a. Steam vessels.

	Totals.	Iron.	Nominal H. P.		Total.	Per vessel.	Total tonnage. Thous. pouds.	Total cost. Thous. roub.
			Paddle.	Screw.				
Passenger	20	20	15	5	348	17	21	282
Freight and passenger	5	5	2	3	407	81	82	276
Freight	2	2	—	2	230	115	108	250
Tug and passenger	1	1	—	1	8	8	0·24	5
Tug	31	31	5	21	890	29	36	548
Total . . .	59	59	22	37	1,883	32	247	1,361

The steam vessels navigating the basin of the Western Dvina use for heating their boilers: 8 vessels, wood fuel; 51, coal. The consumption by all these vessels during the navigation of 1890 was: wood fuel, 1,244 cub. sagenes and coal, 1,219,000 pouds.

b. Vessels other than steamers.

				Length:		Breadth:					
Totals.				Average.	Greatest.	Average.	Greatest.	Average draught, loaded.	Total tonnage.	Total cost.	
				S a g e n e s.							
		Decked.	Open.					Chetv.	Thous. pouds.	Thous. roub.	
Laibas	. . . .	441	—	441	7·8	12·0	1·6	2·5	3·7	658	99
Boats	. . . .	101	—	101	9·6	13·0	1·8	2·8	3·7	182	15
<hr/>											
Total	. 542	—	542	—	13·0	—	2·8	—	840	114	

Conveyance of freights.

By all the ways of the basin of the Western Dvina there were loaded (despatched):

Year.	In vessels.	In rafts.	Total.
	In thousands of pouds.		
1881	2,250	85,656	87,906
1882	2,005	63,000	65,005
1883	2,362	74,273	76,635
1884	2,164	54,454	56,618
1885	1,677	47,300	48,977
1886	1,812	61,456	63,268
1887	2,334	62,724	65,058
1888	1,543	81,552	83,095
1889	2,880	85,817	88,697
1890	2,221	80,418	82,639

On an average for the decade quoted of the total quantity of freights, there were despatched: in vessels, 2,000,000 pouds or 3 per cent; in rafts 70,000,000 pouds or 97 per cent; or a total of 72,000,000 pouds.¹ During the quinquennial period 1886 to 1890 compared with that of 1881 to 1885, the shipment in the basin of the Western Dvina increased: in vessels, by 3 per cent; in rafts, by 7 per cent; or, on the total by 6·5 per cent.

The kind and quantity of the shipments of the principal goods in the basin of the Western Dvina are shewn in the following data:

	1888	1889	1890
	M i l l i o n p o u d s.		
Total breadstuffs.	0·4	1·2	1·0
Salt	0·1	0·1	0·1
Timber and wood fuel . .	82·5	87·1	80·6
Other freights	0·1	0·3	0·9
Total	83·1	88·7	82·6

From the data quoted it appears that in the basin of the Western Dvina there are conveyed, principally with the stream, timber and wood fuel constituting as much as 98 per cent of the total shipments in this basin. No very important wharves as far as regards the quantity of freights despatched occur in this basin; the unloading is concentrated mainly in three points, situated upon the Western Dvina: Riga, Dvinsk and Vitebsk. There arrived in 1890 for unloading: Riga, 72,700,000 pouds; Dvinsk, 2,500,000 pouds; and Vitebsk, 1,600,000 pouds, a total of 76,800,000 pouds or about 95 per cent of the total shipments.

The freights for the conveyance of grain cargoes in the basin of the Western Dvina by raftage assisted with oars in 1892 were: in April, from 12 to 17 kopecks; in May, from 12 to 16 kopecks, per 1,000 pouds and per verst.

6. Basin of the Nieman.

Ways.

The extent of the navigable and raftable ways of the basin of the Nieman is equal to 2,959 versts, of which: navigable sections, 1,005 versts; and raftable, 1,318 versts. Steam communication in this basin is carried on over a length of 493 versts.

The following rivers of the Nieman basin have each a length of above 250 versts:

	Total length.	Navigable.	Raftable.
	V e r s t s.		
Nieman	729 ²	674	26
Viliya	430	41	365
Shchara	287	213	—

¹. Besides this 4,000,000 pouds of timber despatched from the basin of the Dnieper are annually conveyed by navigation of the basin of the Western Dvina.

². The length of the Nieman is only shewn within the limits of Russia, from the source to the Prussian frontier; hence, to its fall into the Kurisch Haff, is about 105 versts.

The average data for 1882 to 1891 upon the time of the opening and closing of the navigation and upon the duration of the spring and autumn ice drifts and the navigation season in the basin of the Nieman according to the stations of observation.

Names of ways and obser- vation stations.	Opening.		Closing.		D u r a t i o n.			Autumn ice drift
	First movement of ice.	Final clear- ing of river.	First ap- pearance of thin ice.	Final set- ting of ice.	Spring ice drift.	Navi- gation season.		
Nieman.								D a y s.
Jurburg	Mar. 3	Mar. 18	Nov. 11	Dec. 14	15	238	33	
Kovno	" 5	" 17	" 11	" 11	12	239	30	
Birshtany, ham. . . .	Feb. 27	" 15	" 11	" 19	16	241	38	
Niemantsy "	" 26	" 14	" 11	" 19	16	242	38	
Druskeniki "	" 17	" 17	" 11	" 24	28	239	43	
Grodno	" 23	" 18	" 11	" 22	23	238	41	
Mosty, ham	Mat. 7	" 17	" 10	" 5	10	238	25	
Morino, vill.	" 10	" 19	" 10	" 6	9	236	26	
Slobttsy, ham.	" 15	" 18	" 1	Nov. 28	3	228	27	
Viliya.								
Yanovo, ham.	Feb. 27	" 17	" 9	Dec. 4	18	237	25	
Vilno	" 26	" 16	" 9	" 14	18	238	35	
Shchara.								
Slonim	Mar. 7	" 16	" 1	Nov. 30	9	230	29	
Dam № VII	" 10	" 17	" 1	" 26	7	229	25	

The least and greatest duration of the spring and autumn ice drifts and of the navigation season in the basin of the Nieman upon the separate rivers are shewn in the following data:

	Spring ice drift.	Autumn ice drift.	Navigation season.
	from — to.	from — to.	from — to.
Nieman	3 — 28	25 — 43	228 — 242
Viliya.	18	25 — 35	237 — 238
Shchara	7 — 9	25 — 29	229 — 230

Fleet of the basin of the Nieman in 1890.

a. Steam vessels.					Nominal H. P.	Total tonnage.	Total cost.
Totals.	Iron.	Paddle.	Screw.	Total.	Per vessel.	Thous. pouds.	Thous. roub.
Passenger	4	3	4	—	123	31	76
Freight and pass.	3	3	2	1	109	36	98
Freight	3	—	—	3	75	25	39
Service	1	1	—	1	12	13	8
Total	11	7	6	5	319	29	221

The steam vessels navigating the basin of the Nieman use for heating their boilers: 7 vessels, wood fuel; and 4, coal. The consumption by these vessels during the navigation of the year 1890 was: 1,561 cub. sag.; and coal, 21,700 pouds.

b Vessels other than steamers.

	Totals.	Decked.	Open.	Length:		Breadth:		Average draught loaded.	Total tonnage.	Total cost.
				Average.	Greatest.	Average.	Greatest.			
				S a g e	n e s.					
Baidarkas . . .	186	1	185	15.0	23.0	2.8	3.7	7.5	1,432	167
Skiffs	145	145	—	10.3	16.1	2.6	3.7	8.7	783	247
Boats	150	79	71	7.6	16.3	2.0	2.8	4.8	304	19
Other types . .	60	45	15	—	—	—	—	—	511	74
Total .	541	270	271	—	—	—	—	—	3,030	507

Conveyance of freights.

On all the ways of the basin of the Nieman there were loaded (despatched)

Year.	In vessels. T h o u s	In rafts. a n d p o	Total. u d s. ¹
1881.	3,355	26,172	29,527
1882.	6,302	30,588	36,890
1883.	6,036	28,040	34,076
1884.	5,789	33,321	39,110
1885.	6,679	32,859	39,538
1886.	6,858	33,172	40,030
1887.	6,954	34,866	41,820
1888.	7,499	48,782	56,281
1889.	6,076	57,021	63,097
1890.	6,817	50,381	57,198

On an average for the decade quoted out of the total quantity of freights there were despatched: in vessels, 6,000,000 pouds, or 15 per cent; in rafts, 37,000,000 pouds, or 85 per cent; or a total of 43,000,000 pouds per annum¹. During the quinquennial period 1886 to 1890, compared with that of 1881 to 1885, the shipment increased: in vessels, by 21 per cent; in rafts, by 48 per cent; or, on the total, by 31 per cent.

The kind and the quantity of the shipments in the basin of the Nieman of the chief goods are shewn in the following data:

¹. Besides this a considerable quantity of timber, approximately 10,000,000 pouds annually, despatched from the basin of the Dnieper is conveyed by navigation of the basin of the Nieman.

G o o d s :	1888.	1889.	1890.
	M i l l i o n p o u d s .		
Wheat	0·3	0·1	0·1
Rye	0·5	0·3	0·1
Oats	0·1	0·2	0·1
Barley	0·1	0·1	—
<hr/>			
Total of chief breadstuffs	1·0	0·7	0·3
Coal	0·1	—	0·1
Timber and wood fuel	52·6	59·4	53·6
Other freights	2·6	3·0	3·0
<hr/>			
Total	56·3	63·1	57·0

Thus the chief part of the shipments in the basin of the Nieman is composed of timber and wood fuel which constitute 95 per cent of the total shipments of this basin. Besides the Kovno wharf upon the river Nieman¹ despatching as much as 6·8 mill. pouds per annum (1890), in the basin of the Nieman there are no very important wharves for despatching freights. The principal wharves in respect of the arrival of freights in this basin are two upon the Nieman, that of Jurburg, where arrived¹ in 1890 as much as 63 mill. pouds, and that of Kovno, at which as much as 7 mill. pouds were unloaded. The total arrivals at these wharves were 70 mill. pouds of freights, despatched from the basins of the rivers Nieman and Dnieper.

7. Basin of the Vistula.

W a y s .

The total extent of the navigable and raftable ways of the basin of the Vistula is equal to 2,997 versts, of which navigable sections, 1,785 versts; and raftable, 1,212 versts. Steam communication in this basin is carried on over a length of 551 versts.

The river Vistula has its source in Austria and falls into the Baltic in Prussia. The length of the Vistula from the Austrian to the Prussian frontier is equal to 618 versts. Upon the whole of this extent the Vistula is navigable. The chief tributary of the Vistula, the Western Bug, also takes its rise in Austria, running a course within the limits of Russia from the Austrian frontier to its fall into the Vistula of 584 versts, of which 308 are navigable and 200 raftable.

¹. In Jurburg 136 thous. pouds only were unloaded, all the rest passed that point and entered Prussia.

². Within the limits of Austria and Prussia the Vistula runs a course of 186 versts within those of Prussia, 217 versts.

The average data for 1882—1891 upon the time of the opening and closing of the navigation and upon the duration of the spring and autumn ice drifts and of the navigation season in the basin of the Vistula according to the stations of observation.

Ways and observation stations.	O p e n i n g.		C l o s i n g.		D u r a t i o n.			
	First movement of ice.	Final clearing of river.	First appearance of thin ice.	Final setting of ice.	Spring ice drift	Navigation season.	Autumn ice drift.	
Vistula.						D a y s.		
Wloclawsk . . .	Feb. 21	Mar. 8	Nov. 14	Dec. 26	15	251	42	
Plock	" 7	" 9	" 14	" 27	30	250	43	
Zakroczim . . .	Jan. 25	" 8	" 12	" 29	42	249	47	
Warsaw	Feb. 25	" 9	" 14	" 24	12	250	40	
Novo - Alexandria, whf. . .	" 18	" 6	" 12	" 20	16	251	38	
Zavikhost . . .	" 13	" 4	" 13	" 22	19	254	39	
Novy Korczin whf.	" 10	" 2	" 10	" 19	20	253	37	
Kozlice	" 5	" 3	" 12	" 17	26	254	35	
Western Bug.								
Zegrze, whf. . .	" 27	" 10	" 13	" 13	11	248	30	
Popowo, will. . .	" 26	" 11	" 11	" 12	13	245	31	
Granno, vill. . .	" 23	" 13	" 11	" 15	18	243	34	
Brest-Litovsk . .	Mar. 5	" 13	" 9	Nov. 21	8	240	12	
Narev.								
Pultusk	Feb. 27	" 10	" 13	Dec. 9	11	248	26	
Ostrolenka . . .	" 28	" 10	" 17	" 9	10	251	22	
Piontnica, vill. .	Mar. 1	" 14	" 12	" 11	13	243	29	
Bobr.								
Goniondz	" 4	" 9	" 17	" 4	5	253	17	

Least and greatest duration of the spring and autumn ice drifts and of the navigation season in the basin of the Vistula upon the separate rivers.

	Spring ice drift.	Autumn ice drift.	Navigation season.
	from — to	from — to	from — to
Vistula.	12 — 42	35 — 47	249 — 254
Western Bug	8 — 13	12 — 34	240 — 288
Narev	10 — 13	22 — 29	243 — 251
Bobr	5	17	253

Fleet of the basin of the Vistula in 1890.

a. Steam vessels.

	Total.	Iron.	Paddle.	Screw.	Nominal Total.	H. P. Per vessel.	Total tonnage. Thous. pouds.	Total cost. Thous. roub.
Passenger	18	18	18	—	555	31	26	367
Freight	2	2	2	—	44	22	5	30
Tug	2	2	2	—	75	38	8	65
Service	2	2	2	—	54	27	2	39
Total	24	24	24	—	728	30	41	501

The steamers navigating the basin of the Vistula use in heating their boilers exclusively coal, of which during the navigation of 1890 all the vessels together consumed 403,500 pouds.

b. Craft other than steam vessels.

		Length: Breadth:						
	Total.	Average.	Greatest.	Average.	Greatest.	Average draught, laden.	Total tonnage.	Total cost.
		S a g e n e s.					Thous. pouds.	Thous. roub.
						Chetv.		
Berlinas	263	17·0	28·3	2·0	3·4	7·0	2,025	710
Galleys	184	8·6	9·0	3·2	3·9	3·3	313	18
Kripas	152	10·2	14·2	2·3	3·3	3·5	334	55
Other types	111	—	—	—	—	—	471	252
Total . . .		710	—	—	—	—	3,143	1,035

In the basin of the Vistula, exclusive of the Western Bug and its tributaries, no ship toll is taken, and therefore there is no record of the kind and quantity of freights, conveyed on the rivers of this basin. But with a view to statistics a register is kept of the passing vessels other than steamers.

Upon the basis of this register are quoted below the data upon the traffic on the Vistula of vessels and rafts in 1890.

Vessels other than steamers.

Down the Vistula.	Steam vessels.	Grain.	Coal.	Wood fuel.	Timber.	Building materials.	Iron.	Other freights.	Total.	Empty.	Rafts.
Zavikhost (above town)	90	25	—	2	2	59	—	46	134	259	375
Warsaw:											
a. above town	559	78	—	115	43	80	2	163	481	5	882
b. below "	1,087	24	212	—	2	49	19	165	471	326	725

Vessels other than steamers.

Up the Vistula.	Steam ves- sels.	Grain.	Coal.	Wood fuel.	Timber.	Building ma- terials.	Iron.	Other freights.	Total.	Empty.	Rafts.
Wloclawsk											
(below town).	237	234	—	—	1	3	—	137	375	151	2,208 ¹
Zavikhost											
(above town) .	88	—	—	35	26	36	—	179	276	50	—
Warsaw:											
a. above town	586	2	2	—	—	4	—	—	8	319	—
b. below „	1,091	34	20	—	59	269	140	148	670	103	—
Wloclawsk											
(below town).	247	—	71	46	2	50	147	238	554	87	—

8. Basin of the Don.

W a y s.

The extent of all the navigable and raftable ways of the basin is equal to 3,777 versts, of which navigable sections constitute 1,865 versts and raftable, 1,912 versts. Steam communication is carried on in this basin over a length of 1,559 versts.

The following rivers of this basin have each a total length of above 500 versts.

	Total length.	Navigable.	Raftable.
	V e r s t s.		
Don	1.822	1.277	324
Northern Donets . .	948	189	332
Khopior	874	—	363
Medvieditsa	639	—	361
Sal	630	32	210

The average data for 1882 to 1891 upon the time of the opening and closing of the navigation season and upon the duration of the spring and autumn ice drifts and the navigation season according to the stations of observation.

¹ The rafts floated down from the upper part of the Vistula below the town of Warsaw are joined by rafts coming from the Dnieper-Bug and Augustus systems.

Ways and stations of observation.	Opening.		Closing.		Duration.		
	First movement of ice.	Final clearing of river.	First ap- pearance of thin ice.	Final setting of ice.	Spring ice drift.	Naviga- tion sea- son.	Autumn ice drift.
Don.					D	a	y s.
Don, mouth . . .	Mar. 6	Mar. 14	Nov. 22	Dec. 10	8	252	18
Rostov	" 9	" 16	" 20	" 5	7	248	15
Melikhovskaya, camp.	" 10	" 16	" 11	" 12	6	239	31
Tsymlianskaya "	" 12	" 19	" 12	" 8	7	237	26
Kalach "	" 18	" 23	" 15	Nov. 27	5	236	12
Ust-Medveditsy "	" 15	" 22	" 8	" 25	7	231	17
Ust-Khopior "	" 14	" 22	" 4	" 23	8	228	19
Pavlovsk	" 15	" 23	" 11	Dec. 2	8	232	21
Gremiachino, vill .	" 18	" 25	" 2	Nov. 28	7	221	26

Donets.

Kamenka, camp. .	" 11	" 17	" 25	Dec. 5	6	252	10
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Khopior.

Griazi-Tsaritsyn rail- way br.	" 22	" 24	" 3	Nov. 18	2	223	15
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The least and greatest duration of the spring and autumn ice drifts and of the navigation season in this basin upon the separate rivers appear in the following data:

	Spring ice drift.	Autumn ice drift.	Navigation season.
	D	a	y s.
	from — to	from — to	from — to
Don	5 — 8	12 — 31	221 — 252
Northern Donets . .	6	10	252
Khopior	2	15	223

Fleet of the basin of the Don in 1890.

a. Steam vessels.

	Total.	Iron.	Paddle.	Screw.	Nominal H.-P.		Total tonnage. Thous. pounds.	Total cost. Thous. roubles.
					Total.	Per vessel.		
Passenger . . .	4	3	4	—	123	31	11	86
Freight and pas- senger . . .	19	19	18	1	1,480	78	251	1,265
Freight	46	46	1	45	2,460	53	1,467	3,586
Tug and passen- ger	5	5	5	—	389	58	28	266
Bug	57	53	50	7	2,325	41	87	1,900
Service	8	7	5	3	105	13	2	105
Total . .	139	133	83	56	6,882	50	1,846	7,208

All the steam vessels of this basin use coal for heating their boilers, of which the consumption during the navigation season of 1890 was 5,123,464 pouds.

b. Vessels other than steamers.

	Totals.	Decked.	Open.	Length.		Breadth.			Total tonnage.	Total cost.
				Average.	Greatest.	Average.	Greatest.	Average draught, laden.		
				S a g e n e s.				Chetv.	Ths. pouds.	Ths. roub.
Barges	217	202	15	22.4	34.6	4.5	6.6	8.5	7,303	2,435
Barkas	128	16	112	5.6	7.3	1.4	2.5	6.3	166	166
Boats	189	107	82	7.6	15.0	2.3	3.7	6.6	586	178
Other types . .	131	—	131	—	—	—	—	—	4,179	88
Total	665	325	340	—	—	—	—	—	12,234	2,867

Conveyance of freights.

Over all the ways of the basin of the Don there were loaded (despatched)

Year.	Vessels.	Rafts.	Total.
	Thousand pouds.		
1881	5,894	13,128	19,022
1882	9,379	14,631	24,010
1883	11,353	13,443	24,796
1884	12,745	11,301	24,046
1885	11,830	7,520	19,350
1886	12,430	6,459	18,889
1887	14,816	7,352	22,168
1888	20,200	12,729	32,929
1889	17,590	11,596	29,186
1890	19,694	12,950	32,644

On an average for the decade quoted of the total quantity of freights in the basin of the Don there were despatched: in vessels, 13,600,000 pouds or 55 per cent; in rafts, 11,100,000 pouds or 45 per cent; or a total of 24,700,000 pouds per annum. During the quinquennial period 1886—1890, compared with that of 1881—1885, the despatch of freights in vessels increased by 65 per cent, while that in rafts diminished by 15 per cent, the total despatch increasing by 22 per cent.

The kind and quantity of the chief goods despatched in the basin of the Don appears from the following data:

	1888.	1889.	1890.
	Million pouds.		
Wheat	4.5	4.9	4.1
Wheat flour	0.1	0.1	0.1
Rye	5.1	3.0	5.4
Oats	0.1	0.2	0.02
Barley	0.8	0.03	0.1
Total of chief grains . .	10.6	8.3	9.7

	1888.	1889.	1890.
	Million pouds.		
Salt	0·04	0·07	0·1
Petroleum and petroleum waste .	0·6	0·6	0·6
Kerosene and other petroleum products	0·7	0·8	0·8
Coal	0·1	0·3	0·3
Timber and wood fuel.	14·5	12·3	14·0
Other goods ¹	6·3	6·9	7·1
Total	32·9	29·2	32·6

Among the above named goods, grain constitutes 30 per cent: petroleum and petroleum products, 4 per cent; timber and wood fuel, 43 per cent; these three kinds of goods form as much as 77 per cent of the total despatched in the basin of the Don.

The most important point of despatch in the basin of the Don is the Kalach wharf, lying at the junction of the Don with the Volga-Don railway.

From this wharf in 1890 there was forwarded a total of 18,200,000 pouds or about 56 per cent of the whole despatch in the Don basin. The freights sent from the Kalach wharf are in the main furnished from the Volga by rail. and consist, according to the data of 1890, of: timber, 12,000,000 pouds; petroleum and petroleum products, 1,400,000 pouds; iron unmanufactured, 1,700,000 pouds; and fish, 1,300,000 pouds,

Grain freights are despatched principally from the following wharves: Konstantin, 2,400,000 pouds; Tsymliansk, 1,500,000 pouds, Nizhni Chir, 1,500,000 pouds. The chief point for arrivals in the basin of the Don is the town of Rostov, whither in 1890 there arrived: grain, 7,700,000 pouds; petroleum and petroleum products, 1,100,000 pouds; iron unmanufactured, 1,500,000 pouds; fish, 1,200,000 pouds; coal, 100,000 pouds; and timber, 10,500,000 pouds; or total of all kinds of freights, 24,200,000 pouds; forming as much as 74 per cent of the total despatch in the basin of the Don.

Freights for grain cargoes in the basin of the Don in 1892.

	Raftage.	By tugs.	
		With stream.	Against stream.
	Per 1,000 pouds and per verst, kopecks.		
April	—	—	10 — 13
May	—	—	10 — 13
June	—	—	10 — 15
July	13 — 19	—	10 — 17
August	14 — 19	11 — 25	14 — 15
September	14 — 19	13 — 25	—
October	22 — 25	15 — 25	—
November	—	25	—

¹. Among which on an average per annum: fish, 2,000,000 pouds; iron unmanufactured 2,000,000 pouds; and sugar, 700,000 pouds.

². By raftage comparatively insignificant quantities were conveyed, and that over short distances.

9. The Dniester.

W a y s.

The river Dniester, within the limits of Russia from the Austrian frontier¹ to its fall into the firth, traverses a distance of 831 versts, of which 778 are navigable and 53 raftable. Steam communication upon the Dniester is carried on from the town of Mohiliov to the estuary, a distance of 594 versts.

Average data for 1882 — 1891 upon the time of the opening and closing of the navigation and upon the duration of the spring and autumn ice drifts and of the navigation season in the basin of the Dniester according to the stations of observation.

Ways and obser- vation stations.	O p e n i n g.		C l o s i n g.		D u r a t i o n.		
	First move- ment of ice.	Final clear- ing of river.	First ap- pearance of thin ice.	Final set- ting of ice.	Spring ice drift. D a	Naviga- tion season. y	Autumn ice drift. s.
Dniester.							
Bendery . . .	Mar. 4	Mar. 15	Nov. 17	Dec. 11	11	247	24
Dubossary, ham. . .	" 1	" 13	" 15	" 7	12	247	22
Soroki.	" 1	" 10	" 14	" 14	9	249	30
Mohiliov	Feb. 27	" 6	" 15	" 12	7	254	27
Zhvanets, ham. .	" 28	" 8	" 17	" 18	8	254	31

As a rule the spring ice drift on the Dniester continues from 7 to 12 days; the autumn ice drift, from 22 to 31 days; and the navigation season, from 247 to 254 days, or from 8 to 8¹/₂ months.

Fleet of the basin of the Dniester in 1890.

a. Steam vessels.

	Total.	Iron.	Paddle.	Nominal H. P.:		Total tonnage. Thous. pouds.	Total cost. Thous. pouds.
				Total.	Per vessel.		
Passenger	2	2	2	40	20	2	21
Tug and passengers .	2	2	2	70	35	6	82
Tug.	7	7	7	390	56	17	409
Total	11	11	11	500	45	25	512

All the steamers navigating the river Dniester, use for heating their boilers exclusively coal, of which the consumption during the navigation season of 1890 was 411,377 pouds.

¹ Within the limits of Austria the Dniester traverses a length of about 445 versts.

b. Vessels other than steamers.

b. Vessels other than steamers.										
	Total.	Decked.	Open.	Length.		Breadth.		Average draught, load- ed.	Total ton- nage.	Total cost.
				Average.	Greatest.	Average.	Greatest.			
				S a g e n e s.							Chetv.	Thous. pouds.	Thous. roub.
Galleys	362	—	362	7·3	7·9	3·9	4·6	4·6	1,412	47
Ferries	211	—	211	8·6	10·0	4·0	4·6	5·3	1,224	82
Other types	87	81*	6	—	—	—	—	—	1,293	488
Total	660	81	579	—	—	—	—	—	3,929	617

Conveyance of freights.

Over the whole Dniester there were loaded (despatched):

Year.	Vessels.	Rafts.	Total.
	T h o u s	a n d	p o u d s.
1881	2,736	1,913	4,649
1882	4,713	1,813	6,526
1883	4,229	1,517	5,746
1884	5,746	1,712	7,458
1885	7,742	2,136	9,878
1886	8,667	2,611	12,278
1887	13,491	2,764	16,255
1888	12,691	1,728	14,419
1889	14,132	2,639	16,771
1890	12,402	3,169	15,571

On an average for the decade quoted of the total quantity of freights, there were despatched: in vessels, 8,600,000 pouds or 80 per cent; in rafts, 2,200,000 pouds or 20 per cent; or a total of 10,800,000 pouds per annum. During the quinquennial period 1886—1890 compared with that of 1881—1885 the despatch increased; in vessels, by 144 per cent; in rafts, by 42 per cent; or on the whole by 117 per cent.

The kind and quantity of the chief goods despatched upon the river Dniester, appear from the following data:

Goods:

	1888.	1889.	1890.
	M i l l i o n p o u d s.		
Wheat	6·0	6·5	6·8
Rye	0·3	0·6	0·3
Oats	0·1	—	—
Barley	0·5	0·3	0·4
Maize	3·8	5·0	2·7
Total of chief grains. . .	10·7	12·4	10·2

	1888.	1889.	1890.
	Million pouds.		
Salt	—	0·1	0·1
Coal	0·3	—	—
Timber and wood fuel	2·5	3·4	3·2
Other freights	0·9	0·9	2·1
Total	14·4	16·8	15·6

From the data quoted it appears that grain constitutes on an average 71 per cent; and timber and wood fuel, 20 per cent of the total despatched by the river Dniester.

The principal quantities of freights were despatched in 1890 from the following wharves.

	Total freights in vessels and rafts.	Grain.
	Thousand pouds.	
Zhvanets	2,922	19
Ataki	1,586	1,328
Soroki	1,572	1,388
Vertiuzheny	769	485
Lalovo	581	233
Kormansk	553	378
Total	7,982	3,832

The despatch from the above named wharves constitutes 53 per cent of the total, and in respect to grain, 38 per cent of the quantity forwarded from all the wharves of the Dniester.

The principal transshipment is concentrated at the Bendery-Varnitsy wharf, where in 1890 there were reshipped: total freights, 9,900,000 pouds, or about 64 per cent of the total despatch; including 7,700,000 pouds grain, or about 75 per cent of the total quantity of grain forwarded.

Freights for grain corgoes during the navigation season of 1892.

	Dniester. Horse traction with current. Per 1000 pouds	Dniester and Black Sea to Odessa, Tugs, with current. and per verst, kopecks.
April	12 — 14	14 — 17
May	12 — 14	13
June	12 — 14	16 — 18
July	13 — 16	16 — 17
August	12 — 15	15 — 18
September	16 — 21	16 — 18
October	13 — 16	13 — 18
November	13 — 19	—

10. Basin of the rivers Narova and Luga and lakes Chud and Pskov.

Ways.

On the Narova seventeen versts from the mouth occur considerable rapids, across which no communication is possible and which divide the basin in question into two separate portions: a. That of the Narova below the rapids with the Luga and the arm of the Rosson joining these rivers in the lower parts; b. That of the Narova above the rapids and of lakes Chud and Pskov.

The total length of the navigable and raftable ways of these basins forms: Norowa basin below rapids, navigable 83, of which open to steam communication, 61 versts; and Narova basin above rapids, with lakes, navigable 362 versts, raftable 53 versts. or a total of 415 versts, of which open to steam communication, 309 versts.

Fleet of the basin of the Narova in 1890.

1. Below the rapids.

a. Steam vessels.

	Totals.	Iron.	Paddle.	Screw.	Nominal Total.	H.—P. Per vessel.	Total ton- nage. Thous. pouds.	Total cost. Thous. roub.
Passenger	2	2	—	2	20	10	0.95	13
Tug and passenger .	1	1	—	1	8	8	0.35	6
Total . . .	3	3	—	3	28	9	1.30	19

Of the three steam vessels navigating this basin one uses wood fuel, and two, coal. The total consumption by these during the vessels navigation season of 1890 was: wood fuel, 100 cub. sages; and coal, 14,000 pouds.

b. Craft other than steam vessels.

	L e n g t h.						Breadth.		
	Total.	Decked.	Open.	Average.	Greatest.	Average.	Greatest.	Average draught, loaded.	Total ton- nage.
				S a g e s.				Chetv.	Thous. pouds.
Boats	48	4	44	6.3	7.5	2.6	2.9	6.3	65
Mezheumoks . .	35	30	5	12.9	14.0	3.7	3.0	10.0	287
Shkuts	33	32	1	9.6	11.0	2.9	2.9	12.6	205
Other types . .	27	27	—	—	—	—	—	—	554
Total . . .	143	93	50	—	—	—	—	—	1.111
									247

2. Above the rapids with lakes.

a. Steam vessels.

	Totals.	Iron.	Paddle.	Screw.	Nominal H.—P. Total.	Per vessel.	Total ton- nage. Thous. pounds.	Total cost. Thous. roub.
Passenger	6	4	1	5	79	13	4	66
Freight and passeng.	1	1	1	—	50	50	3	45
Tug and passenger.	2	1	1	1	48	24	3	21
Tug	5	4	2	3	157	31	4	63
Service	1	—	—	1	1	1	0.16	2
Total.	15	10	5	10	335	22	14	197

The steam vessels navigating the basin of the Narova below the rapids use for heating their boilers, 14 vessels, wood fuel; and one vessel, coal.^b The total consumption by these vessels during the navigation season, of 1890 was: wood fuel, 1,573 cub. sagenes; and coal, 500 pouds.

b. Craft other than steamers.

		L e n g t h.						Breadth.		
Total.		Decked.	Open.	Average.	Greatest.	Average.	Greatest.	Average draught loaded.	Total tonnage.	Total cost.
		S a g e n e s.						Chctv.	Thous. pounds.	Thous. roub.
Boats	275	1	274	6.3	8.0	3.2	4.3	6.6	715	193
Other types . . .	136	4	132	—	—	—	—	—	177	40
Total. .		411	5	406	—	—	—	—	892	233

Conveyance of freights.

In the basin of the Narova below the rapids there were loaded (despatched)

Year.	In vessels. T h o u s a n d p o u d s.	In rafts.	Total.
1881	769	1,789	2,558
1882	1,413	2,661	4,074
1883	1,139	2,225	3,364
1884	1,950	2,356	4,306
1885	1,836	1,134	2,970
1886	2,110	2,225	4,335
1887	1,739	1,701	3,440
1888	1,355	6,285	7,640
1889	1,704	5,859	7,563
1890	1,914	3,866	5,780

On an average for the decade quoted, out of the total quantity of freights of the basin of the Narova below the rapids there were conveyed: in vessels, 1,600,000 pouds or 35 per cent: in rafts, 3,000,000 pouds or 65 per cent, or a total of 4,600,000 pouds per annum. During the quinquennial period 1886—1890, compared with that of 1881—1885, the despatch increased, in vessels, by 24 per cent; in rafts, by 96 per cent; or in all, by 60 per cent.

The freights conveyed in this basin consist almost exclusively of timber and wood fuel, of which on the average for the last three years, 1888 — 1890, there were about 6,800,000 pouds per annum, or as much as 97 per cent of the total despatched.

In the basin of the Narova above the rapids and of the lakes Chud and Pskov there were loaded (despatched ¹):

	In vessels.	In rafts.	Total.
	T h o u s	a n d	p o u d s .
1881	1,097	2,517	3,614
1882	1,985	2,160	4,145
1883	1,248	2,789	4,037
1884	978	2,398	3,376
1885	948	2,976	3,924
1886	1,127	2,517	3,644
1887	832	2,262	3,094
1888	1,151	2,868	4,019
1889	1,065	4,426	5,491
1890	1,337	5,004	6,341

In the total quantity of the freights despatched in the basin of the Narova above the rapids the freights in vessels constitute 25 per cent., and those in rafts, 75 per cent. During the quinquennial period 1886 — 1890, compared with that of 1881—1885, the despatch of freights in vessels decreased by 12 per cent, while that of freights in rafts increased by 40 per cent, or on the whole there was an increase of 23 per cent.

In this basin the freights conveyed also consist principally of timber and wood fuel, forming as much as 94 per cent of the whole traffic.

¹ The data quoted upon traffic in the basin of the Narova above the rapids and of the lakes Chud and Pskov are incomplete, seeing that till 1891 the registration of the freights was carried out only at one point, namely at the Kulga wharf upon the river Narova. Since 1891 a new point has been instituted at the town of Pskov upon the river Velikaya, falling into lake Pskov. According to the returns from this last point for 1891—1892, besides freights registered at the Kulga wharf, there was a further annual shipment in this basin of one million pouds.

III. Uniting systems of the water ways.

Systems uniting the basins of the Caspian Sea, the Baltic and the White Sea.

1. Maria System.

Into the composition of the system, reckoning its terminal points as Rybinsk at the junction of the Sheksna with the Volga and St. Petersburg at the estuary of the Neva (i. e. including also the section from the junction of the Svir with the Emperor Alexander III's Canal above St. Petersburg), enter the following separate ways:

	Length of sections.
a. Volga branch.	
The Sheksna from Rybinsk to the Bielozersk canal . . .	398·000 versts.
The Bielozersk canal between the Sheksna and the Kovzha .	63·254 „
The Kovzha from the Bielozersk canal to the Maria canal .	65·461 „
b. Dead-water dividing section.	
The New Maria canal between the St. Alexander lock and the St. Peter lock	6·000 „
c. Baltic branch.	
The New Maria canal from the St. Peter lock to the Vytegra	2·000 „
The Vytegra from the Maria canal to the Onega canal .	57·648 „
The Onega canal between the Vytegra and the Svir . .	63·120 „
The Svir from the Onega canal to the Emperor Alexan- der III's canal	190·000 „
The Emperor Alexander III's canal between the Svir and the Sias	43·660 „
(Parallel Emperor Alexander I's canal, 38 versts).	
The Empress Maria Feodorovna's canal between the Sias and the Volkhov	9·596 „
(Parallel Empress Catharine II's canal, 10 versts).	
The Emperor Alexander II's canal between the Volkhov and the Neva	103·500 „
(Parallel Emperor Peter the Great's canal, 104 versts).	
The Neva from the Emperor Alexander II's canal to mouth.	69·000 „
Total	1,071:239 versts.

In the Maria system there are in all 31 locks, of which: 3, upon the Bielozersk canal; 2, upon the Kovzha, 2, upon the New Maria canal; and 24, upon the Vytegra. At the present time locks are being constructed upon the rapids part of the Sheksna.

The traffic over the Maria system in 1888—1890 appears from the following data:

a. Towards St. Petersburg.

	Steam.	V e s s e l s.		Total.	Rafts.
		Loaded.	Empty.		
At Rybinsk, on Sheksna.					
In 1888	745	3,226	—	3,971	—
„ 1889	672	2,725	—	3,397	—
„ 1890	647	2,482	—	3,129	—
At Bielozersk, on Bielozersk canal.					
In 1888	—	3,417	—	3,417	2,040
„ 1889	—	2,640	—	2,640	1,573
„ 1890	—	2,419	—	2,419	2,652
At the St. Constantine lock, on the Kovzha.					
In 1888	—	3,753	64	3,817	3,195
„ 1889	—	3,004	64	3,068	4,457
„ 1890	—	2,727	130	2,857	4,331
At the St. Alexander lock, on the New Maria canal.					
In 1888	—	3,773	63	3,836	2,332
„ 1889	—	3,036	18	3,054	4,452
„ 1890	145	2,743	59	2,947	3,086
At Voznesenie, vill. on the Svir.					
In 1888	1,553	4,258	—	5,811	5,950
„ 1889	1,463	3,599	—	5,062	6,350
„ 1890	1,462	3,405	—	4,867	5,490
At Kondratievo ¹ , vill. on Emperor Alexander III's and I's canals.					
In 1888	182	5,749 (103)	36 (36)	5,967 (139)	8,076 (8,076)
„ 1889	193	5,046 (109)	—	5,239 (109)	6,881 (6,881)
„ 1890	214	5,362 (146)	—	5,576 (146)	8,051 (8,051)

¹ The figures, placed in brackets, express the traffic over the old parallel canals of the Emperor Alexander I, the Empress Catharine II and of the Emperor Peter the Great.

	Steam.	V e s s e l s.		Total.	Rafts.
		O t h e r.			
At Siaski Riadki ¹ , on Empress Maria Feodorovna's and Catharine II's canals.		Loaded.	Empty.		
In 1888	327	8,000 (668)	—	8,327 (668)	11,918 (11,918)
" 1889	370	7,179 (772)	—	7,549 (772)	8,475 (8,475)
" 1890	382	7,148 (603)	—	7,530 (603)	9,712 (9,712)
At Novaya Ladoga ¹ , on Emps. Alexander II's and Peter the Great's canals.					
In 1888	354	10,366 (368)	54 (34)	10,774 (402)	17,934 (17,934)
" 1889	403	9,608 (365)	88 (19)	10,099 (3,841)	17,971 (17,971)
" 1890	416	9,769 (297)	126	10,311 (1,297)	17,527 (17,527)
At Schlüsselburg ¹ , on Emps. Alexander II's, and Peter the Great's canals.					
In 1888	354	11,153 (1,138)	—	11,507 (1,138)	17,955 (17,955)
" 1889	388	10,669 (1,119)	—	11,057 (1,119)	17,997 (17,997)
" 1890	408	10,893 (1,171)	—	11,301 (1,171)	17,553 (17,553)

b. From St. Petersburg.

	Steam.	V e s s e l s.		Total.	Rafts.
		O t h e r.			
At Schlüsselburg, on Emps. Alexander II's and Peter the Great's canals.		Loaded.	Empty.		
In 1888	353	995 (788)	5,773 (5,773)	7,121 (6,561)	—
" 1889	403	1,046 (782)	6,096 (5,980)	7,545 (6,771)	—
" 1890	423	951 (662)	6,789 (6,727)	8,163 (7,389)	—
At Novaya Ladoga, on Emps. Alexander II's and Peter the Great's canals.					
In 1888	358	977 (773)	5,177 (5,163)	6,512 (5,938)	—
" 1889	404	1,028 (761)	5,383 (5,269)	6,815 (6,030)	—
" 1890	418	940 (650)	5,925 (5,883)	7,223 (6,533)	—

¹ The figures, placed within brackets, express the traffic over the old parallel canals of the Emperor Alexander I, Catharine II and of the Emperor Peter the Great.

Continuation of the traffic from St. Petersburg.

At Siaski Riadki, ¹ vill., on Emps. Maria Feodorovna's and Catharine II's canals.		Steam.	V e s s e l s.		Total.	Rafts.
			O t h e r.			
			Loaded.	Empty.		
In 1888	325	717	4,102	5,144	—	
		(557)	(4,102)	(4,659)		
„ 1889	367	890	4,134	5,391	—	
		(648)	(4,090)	(4,738)		
„ 1890	383	871	4,572	5,826	—	
		(616)	(4,572)	(5,188)		
At Kondratievo, ¹ vill. on Emps. Alexander III's and Alexander I's canals.						
In 1888	182	392	3,189	3,763	—	
		(392)	(3,189)	(3,583)		
„ 1889	194	353	3,261	3,808	—	
		(353)	(3,261)	(3,614)		
„ 1890	214	357	3,558	4,129	—	
		(357)	(3,558)	(3,915)		
At Voznesenie, vill. on Svir.						
In 1888	1,542	276	1,366	3,184	—	
„ 1889	1,457	281	1,679	3,417	—	
„ 1890	1,473	254	1,140	2,867	—	
At the St. Alexander lock, on New Maria canal.						
In 1888	—	103	998	1,101	—	
„ 1889	—	168	1,191	1,359	—	
„ 1890	149	141	807	1,097	—	
At the St. Constantine lock, on Kovzha.						
In 1888	—	196	1,007	1,203	190	
„ 1889	—	237	1,153	1,390	234	
„ 1890	—	229	845	1,074	144	
At Bielozersk, on the Bielozersk canal.						
In 1888	—	147	856	1,003	—	
„ 1889	—	221	1,196	1,417	—	
„ 1890	—	197	902	1,099	—	
At Rybinsk, on the Sheksna.						
In 1888	693	494	1,849	3,036	9,400	
„ 1889	742	481	1,861	3,084	13,480	
„ 1890	637	431	1,340	2,408	3,860	

¹ The figures, within brackets, express the traffic over the old parallel canal of the Emperor Alexander I, the Empress Catharine II and of the Emp. Peter the Great.

The cost of traction of vessels by the Maria system from Rybinsk to St. Petersburg in 1892.

	Length of section versts.	Modes of traction.	Average cost of traction.		Duration of traction Days. from to
			Per vessel. Roub.	Per poud. Kop.	
By the Sheksna and the Bielozersk canal.					
1. From Rybinsk to Bielozersk .	415	{ horse traction chain tug steam tug.	67 275 237	1·12 1·55 1·29	12—14 7—12 8—16
By the Bielozersk canal, the Kovzha, New Maria canal, and the Vytegra					
2. From Bielozersk to the St. Nicholas lock	126	{ horse traction hauling by men	34 40	0·18 0·21	{ 5—7
By the Vytegra					
3. From St. Nicholas lock to Vytegra	42	hauling by men	52	0·28	5—8
By the Vytegra and Onega canal					
4. From the Vytegra to Voznesenie	73	horse traction	17	0·09	4—6
By the Svir					
5. From the Voznesenie to the junction with the Emp. Alexander III's canal.	190	Steam tug	95	0·50	3—7
By the Emp. Alexander III's canal..					
6a. From the Svir to the Sias . .	44	horse traction	14	0·08	2—3
By the Emp. Alexander I's canal.					
6b. From the Svir to the Sias .	49	„ „	14	0·35	2
By the Empr. Maria Feoderovna's can.					
7a. From the Sias to the Volkhov.	10	„ „	5	0·03	0·25
By the Empr. Catherine II's canal.					
7b. From the Sias to the Volkhov.	10	„ „	2·25	0·03	0·25
By the Empr. Alexander II's canal.					
8a. From the Volkhov to the Neva.	104	„ „	29	0·14	3—5
By the Empr. Peter the Great's can.					
8b. From the Volkhov to the Neva.	104	„ „	38	0·48	5—10
9. From Schlüsselburg to the Kashi- lashnikov wharf	55	Steam tug	16·50	0·08	0·25
<hr/>					
Total from Rybinsk to St. Petersburg, not reckoning parallel canals (6b, 7b and 8b),	1.059	{ Steam traction by Sheksna Horse traction by Sheksna	522 332	2·81 2·51	30—51 35—51

Freights for grain cargoes upon the Maria system from Rybinsk to St. Petersburg in 1892.

	Per 1,000 pouds and per verst. Kopecks.
In April	7 — 9
„ May	6 — 11
„ June	6 — 9
„ July	6 — 11
„ August	7 — 9
„ September	9 — 11

2. Tikhvin System.

Into the composition of the system, taking it from the town of Mologa at the confluence of the river of that name with the Volga to the village of Siaski Riadki at the fall of the Sias into Lake Ladoga, enter:

Length of section.

a. Volga branch.

The Mologa from its fall into the Volga to the mouth of the Chagodoshcha	202·000	versts.
The Chagodoshcha from the Mologa to the mouth of the Goriun	157·000	„
The Goriun from the Chagodoshcha to Lake Vazhan	12·000	„
Lake Vazhan from the Chagodoshcha to the Sominka	3·076	„
The Sominka from Lake Vazhan to Lake Somino	29·428	„
Lake Somino from the Sominka to the Valchina	1·000	„
The Valchina from Lake Somino to the Tikhvin canal	9·312	„

b. Dead-water dividing section.

The Tikhvin canal between Lakes Somino and Krupino	1·268	„
Lake Krupino	0·454	„
The Tikhvin canal between Lakes Krupino and Lebedino	3·470	„
Lake Lebedino	1·370	„

c. Baltic branch.

The Tikhvinka from Lake Lebedino to junction with the Sias	145·000	„
The Sias from the Tikhvinka to Siaskie Riadki	89·000	„

Total 654·378 versts.

On the Tikhvin system there are in all 62 locks of which: 3, on the Goriun; 8, on the Sominka; 3, on the Valchina; and 48, on the Tikhvinka.

The traffic over the Tikhvin system in 1888—1890 appears from the following data:

Towards St. Petersburg.						From St. Petersburg.			
V e s s e l s.					Rafts.	V e s s e l s.			
Steam.	Other	Total.	Loaded.	Steam.		O t h e r.		Total.	
						Loaded.	Empty.		
At Somino, vill. on Sominka.									
a. Below wharf.									
In 1888 . . .	—	435	435	2,034	—	180	175	355	
" 1889 . . .	—	527	527	812	—	189	236	425	
" 1890 . . .	—	562	562	378	—	167	383	550	
b. Above wharf.									
In 1888 . . .	—	415	415	2,215	—	206	—	206	
" 1889 . . .	—	525	525	1,505	—	225	—	225	
" 1890 . . .	—	604	604	885	—	210	—	210	
At Siaski Riadki, vill. on Sias.									
In 1888 . . .	174	2,118	2,292	3,440	143	511	928	1,582	
" 1889 . . .	145	2,141	2,286	1,903	145	664	844	1,653	
" 1890 . . .	162	1,689	1,851	1,400	162	616	1,215	1,993	

3. Vyshni Volochok System.

Into the composition of the system, taking it from the town of Tver at the confluence of the Tvertsa with the Volga to Novaya Ladoga at the fall of the Volkhov into Lake Ladoga, enter:

	Length of section.
a. Volga branch.	
The Tvertsa from Tver to the Tvertsa canal . .	176·000 versts.
b. Dead-water dividing section.	
Tvertsa canal between the Tvertsa and the Tsna.	2·727 "
The Tsna between the Tvertsa and Tsna canals.	0·500 "
The Tsna canal.	1·150 "
c. Baltic branch.	
The Tsna from the Tsna canal to Lake Mstino..	6·500 "
Lake Mstino	12·000 "
The Msta from lake Mstino to the Sivers canal. .	402·000 "
The Sivers canal between the Msta and Volkhov.	8·500 "
(Parallel Vishera canal, 15 v.; the Vishera, 5 v.; and Little Volkhovets, 5 v.).	
The Volkhov from the Sivers canal to Novaya Ladoga	203·000 "
Total . . .	812·377 versts.

On the Vyshni Volochok system there are in all 4 locks: 2, on the Tvertsa; 1, on the Tsna; and 1, on the Msta and 1 half-lock, on the Tsna canal.

The traffic over the Vyshni Volochok system in 1888—1890 appears from the following data:

a. Towards St. Petersburg.

		V e s s e l s.				
At Tver on the Tvertsa.		Steam.	O t h e r.		Total.	Rafts.
			Loaded.	Empty.		
In	1888	—	154	3	157	—
„	1889	—	87	25	112	—
„	1890	—	108	18	126	—

At Vyshni Volochok.

a. On the Tvertsa canal.

In	1888	—	40	—	40	—
"	1889	—	32	2	34	—
"	1890	—	26	2	28	—

b. On the Tsna canal.

In	1888	—	48	1	49	—
"	1889	—	42	—	42	—
"	1890	—	10	—	10	—

At Opechensk, settl. on Msta
below wharf.

In	1888	—	69	202	271	688
"	1889	—	65	162	227	1,418
"	1890	—	29	175	204	1,962

At Poterpelitsy, whf. on Msta
below wharf.

In	1888	—	398	—	398	794
"	1889	—	369	—	369	1,645
"	1890	—	319	—	319	755

At Novgorod, by Sivers and
Vishera canals ¹.

In	1888	—	743 (386)	33 (18)	776 (404)	4,352 (3,900)
"	1889	—	704 (355)	9 (9)	713 (364)	3,618 (3,047)
"	1890	—	657 (208)	3 (3)	660 (211)	4,635 (3,401)

¹ The figures, placed within brackets, express the traffic over the parallel Vishera canal.

At Novgorod on Volkhov below the town.		V e s s e l s.			Total.	Rafts.
		Steam.	O t h e r.			
			Loaded.	Empty.		
In	1888.	465	1,442	52	1,959	7,968
"	1889	531	1,378	17	1,926	9,334
"	1890	579	1,310	20	1,909	11,170

At Gostinopolie, vill. on Volkhov above wharf.		Steam.	O t h e r.		Total.	Rafts.
			Loaded.	Empty.		
In 1888		328	1,958	—	2,286	13,011
" 1889		277	1,760	—	2,037	15,327
" 1890		329	1,626	—	1,955	15,032

At Novaya Ladoga, on Volkhov.		Steam.	O t h e r.		Total.	Rafts.
			Loaded.	Empty.		
In 1888		606	2,597	36	3,239	6,945
" 1889		640	2,442	49	3,131	8,696
" 1890		693	2,324	68	3,085	7,972

b. From St. Petersburg.

At Novaya Ladoga, on Volkhov.		V e s s e l s.				Rafts.
		Steam.	O t h e r.		Total.	
			Loaded.	Empty.		
In	1888	604	237	997	1,838	—
"	1889	640	245	1,040	1,925	—
"	1890	677	222	1,113	2,012	—

At Gostinopolie, on Volkhov above wharf.		Steam.	O t h e r.		Total.	Rafts.
			Loaded.	Empty.		
In 1888		327	260	325	912	—
" 1889		277	96	299	672	—
" 1890		329	152	304	785	—

At Novgorod, on Volkhov below the town.		Steam.	O t h e r.		Total.	Rafts.
			Loaded.	Empty.		
In 1888		472	244	94	810	—
" 1889		542	211	175	928	—
" 1890		575	169	159	903	—

At Novgorod, by Sivers and Vishera canals ¹		Steam.	O t h e r.		Total.	Rafts.
			Loaded.	Empty.		
In 1888		—	15 (14)	39 (13)	54 (27)	—

¹ The figures, placed within brackets, express the traffic over the parallel Vishera canal.

(Continued).

V e s s e l s.					
	Steam.	O t h e r,		Total.	Rafts.
		Loaded.	Empty.		
In 1889	—	12 (1)	58 (19)	70 (20)	—
„ 1890	—	5	94 (13)	99 (13)	—

At Vyshni Volochok, on Tvertsa canal.

In 1888	—	17	26	43	—
„ 1889	—	14	14	28	—
„ 1890	—	13	11	24	—

At Tver, on Tvertsa.

In 1888	—	67	15	82	—
„ 1889	—	75	29	104	125
„ 1890	—	71	66	137	—

4. Duke Alexander of Wirtemberg System.

Into the system, taking it from the Sheksna a tributary of the Volga to the junction of the Sukhona and Yug, forming the Northern Dvina, enter the following ways:

	Length of section.
a. Volga branch.	
Topornia canal from the Sheksna to lock № V . . .	1·366 versts.
b. Dead-water dividing section.	
Topornia canal from lock № V to Lake Sivers . . .	5·094 „
Lake Sivers	4·720 „
Kuzma canal between Lakes Sivers and Babie . . .	1·250 „
Lake Babie	1·670 „
The Pozdyshka between Lakes Babie and Zaulom . . .	3·136 „
Lake Zaulom	2·500 „
1. Vazerin canal between Lakes Zaulom and Vazerin . .	2·670 „
Lake Vazerin	0·600 „
2. Vazerin canal between Lakes Vazerin and Kishem . .	2·610 „
Lake Kishem	1·354 „
Kishem canal between Lake Kishem and the Itkla . .	2·430 „
c. Northern Dvina branch	
The Itkla from the Kishem canal to Lake Blagoveshchensk	3·940 „

	Length of section.
Lake Blagoveshchensk	2·050 „
The Porozovitsa between Lakes Blagoveshchensk and Kubena	31·223 „
Lake Kubena	60·000 „
The Sukhona from Lake Kubena to its junction with the Yug	527·000 „
Total . . .	653·607 versts.

On the system of Duke Alexander of Wirtemberg there are in all 11 locks: 5, on the Topornia canal; 1, on the Itkla; 4, on the Porozovitsa, and 1, on the Sukhona.

The traffic over this system in 1888—1890 appears from the following data:

		Towards the Sheksna,				From the Sheksna.						
		V e s s e l s.				V e s s e l s.						
		Steam.	Other.	Total.	Rafts.	Steam.	Other.	Total.	Rafts.			
At Kirilov:		Load- ed.	Empty.			Load- ed.	Empty.					
a. below the Kir. whf.												
Въ	1888	г. . .	—	358	43	401	78	—	169	5	174	2
„	1889	„ . .	—	325	102	427	85	—	215	3	218	30
„	1890	„ . .	—	310	101	411	210	—	216	23	239	—
b. above the Kir. whf.												
Въ	1888	г. . .	—	295	17	312	75	—	116	9	125	2
„	1889	„ . .	—	306	52	358	279	—	146	9	155	—
„	1890	„ . .	—	364	69	433	77	—	118	28	146	—

B. Systems uniting the basins of the Black Sea and the Baltic.

1. Dnieper Bug System.

Into the composition of the system, taking it from the estuary of the Pripiat, a tributary of the Dnieper to the confluence of the Western Bug with the Vistula, enter the following ways:

	Length of section.
a. Dnieper branch.	
The Pripiat from the Dnieper to the mouth of the Yasolda	468·000 verstz.
The Yasolda from the Pripiat to the mouth of the Pina	21·000 „

	Length of section.
The Pina from the Yasolda to its junction with the Dnieper Bug canal	54·776 versts.
The Dnieper Bug canal from the Pina to the Selishch dam	39·106 „
b. Dead water dividing section.	
The Dnieper Bug canal between the Selishch and Vygod dams	24·720 „
c. Vistula branch.	
The Dnieper Bug canal from Vygod dam to the Mukhovets	12·259 „
The Mukhovets from the Bug canal to its fall into the Western Bug	83·116 „
The Western Bug from the mouth of the Mukhovets to its fall into the Vistula	308·000 „

Total 1,010·977 versts.

On the Dnieper Bug canal there are 22 Poire portable dams: 4, on the Pina; 4, on the Dnieper incline of the canal; 3, on the Vistula incline of the canal; 10, on the Mukhovets; and 1, on the Western Bug.

The traffic over this system in 1888—1890 appears from the following data:

At Pinsk.	Towards the Vistula.				From the Vistula.				Rafts.
	V e s s e l s.		Rafts.		V e s s e l s.		Rafts.		
	Steam.	O t h e r.			O t h e r.	Total.			
a. below the wharf.	Loaded.		Total.		Steam.	Load- ed.	Empty.		
In 1888	98	94	192	9,016	101	70	45	216	900
„ 1889	81	122	203	12,446	86	389	—	475	1,922
„ 1890	165	147	312	12,966	172	208	—	380	1,950
b. above wharf.									
In 1888	—	34	34	11,128	—	5	—	5	—
„ 1889	—	43	43	17,551	5	14	—	19	—
„ 1890	—	254	254	18,087	8	—	—	8	—
At Brest-Litovsk ¹ :									
a. on the Mukhovets.									
In 1890	—	23	23	2,865	8	—	—	8	—
b. on the Western Bug:									
aa. above the town.									
In 1890	—	—	—	212	—	—	—	—	—
bb. below the town.									
In 1890	—	—	—	3,120	8	—	—	8	—

¹ A record of information upon the traffic at Brest-Litovsk was instituted in 1890.

2. Oginsk System.

Into the composition of the system taking it from the mouth of the Pina belonging to the Dnieper basin, to the mouth of the Shchara, falling into the Nieman, enter the following ways:

		Length of section.
a. Dnieper branch.		
The Yasolda from the mouth of the Pina to the Oginsk canal		37·000 versts,
The Oginsk canal from the Yasolda to lock № IX		29·530 „
b. Dead-water dividing section.		
The Oginsk canal from lock № IX to Lake Vygon		13·190 „
Lake Vygon		4·850 „
The Oginsk canal from Lake Vygon to lock № X.		0·400 „
c. Nieman branch.		
The Oginsk canal from lock № X to its junction with the Shchara		2·310 „
The Shchara from the Oginsk canal to its fall in to the Nieman		205·250 „
Total		292·530 versts.

On the Oginsk system there are 10 locks, 11 Poire portable dams and 2 Shandor dams. These constructions are situated: upon the Yasolda, 2 portable dams, upon the Dnieper incline of the canal 9 locks; upon lake Vygon, 1 Shandor dam; upon the Nieman incline of the canal, 1 lock; and upon the Shchara, 9 portable dams and 1 Shandor dam.

The traffic over the Oginsk system in 1888 — 1890 appears from the following data:

		Towards the Nieman.				From the Nieman.			
		V e s s e l s.				V e s s e l s.			
		Other.				Other.			
At Telekhan, ham, on Oginsk canal:		Steam.	Load- ed.	Empty.	Total	Rafts.	Steam.	Load- ed.	Empty.
a. below the town.									
In 1888		—	30	—	30	3,995	—	56	—
„ 1889		—	31	—	31	3,984	—	61	—
„ 1890		—	35	—	35	6,668	—	96	—
b. above the town.									
In 1888		—	12	—	12	5,599	—	3	—
„ 1889		—	13	—	13	5,539	—	4	—
„ 1890		—	13	—	13	7,724	—	—	—
At Slonim, on the Shchara.									
a. below the town.									
In 1890		—	9	—	9	12,865	—	—	—
b. above the town.									
By 1890		—	7	—	7	17,085	—	—	—

¹ The record of information upon the traffic at the town of Slonim was instituted in 1890.

3. The Berezina System.

Into the composition of the system, taking it from the mouth of the Berezina falling into the Dnieper to the mouth of the Ulla, falling into the Western Dvina, enter the following ways:

	Length of section.
a. Dnieper branch.	
The Berezina from mouth to junction with Serguch canal	363·000 versts.
The Serguch canal between the Berezina and Serguch	8·469 ..
The Serguch from the Serguch canal to its issue from Lake Manets	10·093 ..
b. Dead-water dividing section.	
Lakes Manets and Plavio	5·310 ..
Junction canal from Lake Plavio to lock № IV	7·700 ..
c. Western Dvina branch.	
Junction canal from lock № IV to Lake Bereshto	6·326 ..
Lake Bereshto	1·690 ..
The Bereshta between Lake Bereshto and the Verebie canal	6·249 ..
The Verebie canal between the Bereshta and Essa	2·458 ..
The Essa from the Verebie canal to Lake Prosho	11·788 ..
Lake Prosho	0·460 ..
1st Lepel canal between Lakes Prosho and Lepel	0·920 ..
Lake Lepel between the 1st Lepel canal and the Ulla	1·500 ..
The Ulla from Lake Lepel to the 2nd Lepel canal	0·350 ..
The 2nd Lepel canal	0·220 ..
The Ulla from the 2nd Lepel canal to Lake Zhezhchino	10·160 ..
Lake Zhezhchino	0·800 ..
The Ulla from Lake Zhezhchino to the Chashniki canal	34·900 ..
The Chashniki canal	1·130 ..
The Ulla from the Chashniki canal to the Western Dvina	48·000 ..
Total	514·523 versts.

On the Berezina system there are in all 12 locks and 1 half-lock. The locks are situated: 3, on the Serguch canal; 4, on the junction canal; 2, on the Verebie canal; 1, on the 1st Lepel canal; and 2, on the Chashniki canal; and the half-lock on the 2nd Lepel canal.

The traffic over this system in 1888—1890 appears from the following data:

At Lepel, on the Essa and Ulla.	Towards the Western Dvina.				From the Western Dvina.			
	V e s s e l s.			Rafts.	V e s s e l s.			
	Without steam.				Without steam.			
	Loaded.	Empty.	Total.		Loaded.	Empty.	Total.	
In 1888 . . .	—	—	—	21,760	—	—	—	
„ 1889 . . .	26	—	26	22,170	—	26	26	
„ 1890 . . .	—	—	—	21,870	—	—	—	

4. Augustus System.

Into the composition of the system, taking it from the Nieman to the confluence of the Narev with the Western Bug, falling into the Vistula, enter the following ways:

a. Nieman branch.	Length of section.
Augustus canal from the Nieman to its junction with the Gancha	6·100 versts.
The Gancha	21·200 „
The Augustus canal from the Gancha to the lock Gorchitsa	12·300 „
b. Dead-water dividing section.	
The Augustus canal from the lock Gorchitsa to the lock Svoboda	8·800 „
c. Vistula branch.	
The Augustus canal from the lock Svoboda to the Bobr	46·750 „
The Bobr from the Augustus canal to its fall into the Narev	65·000 „
The Narev from the mouth of the Bobr into its fall into the Western Bug	194·000 „
Total	354·150 versts.

On the Augustus system there are 18 locks, of which: 6 on the Nieman incline of the canal; 5, on the Gancha; and 7, on the Vistula incline of the canal.

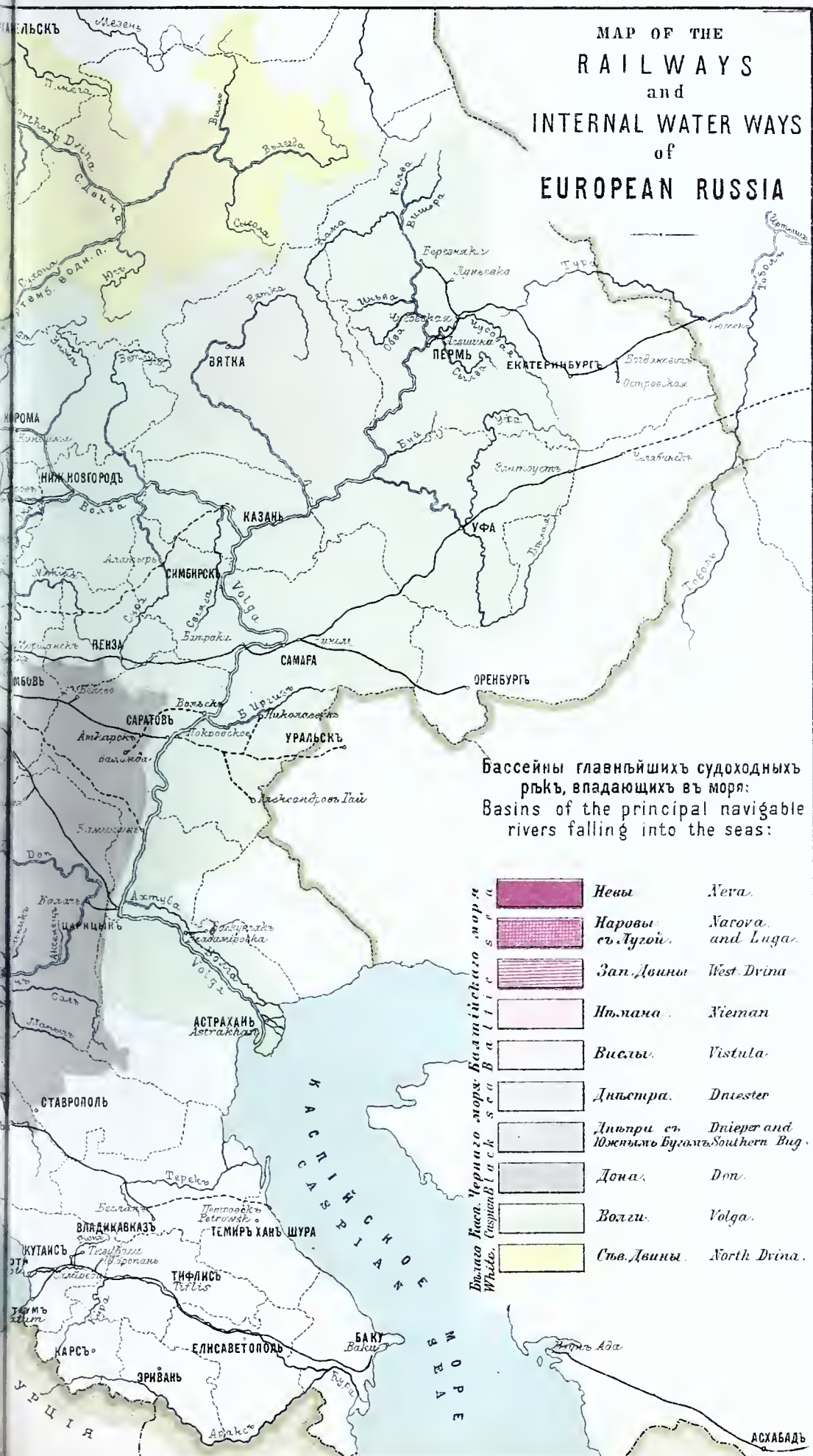
The traffic over this system in 1890 appears from the following data:

	Towards the Vistula.					From the Vistula:				
	V e s s e l s.					V e s s e l s.				
	Steam.	O t h e r.	Total.			Steam.	O t h e r.	Total.		
		Load- ed.	Empty.				Load- ed.	Empty.	Total.	Rafts.
At the lock Niemново. (at the junction of the canal with the Nieman).	—	7	6	13	554	1	3	4	8	104
At the lock Dembovo. (at the junction of the canal with the Bobr).	1	11	—	12	448	—	—	10	10	—

КАРТА ЖЕЛѢЗНЫХЪ И ВНУТРЕННИХЪ ВОДНЫХЪ ПУТЕЙ СООБЩЕНІЯ ЕВРОПЕЙСКОЙ РОССІИ.



MAP OF THE RAILWAYS and INTERNAL WATER WAYS of EUROPEAN RUSSIA



Бассейны главнейших судоходных
рѣкъ, впадающихъ въ моря:
Basins of the principal navigable
rivers falling into the seas:

Невы	Нева.
Наровы съ Лугой.	Narova and Luga.
Зап. Двины	West Drina
Нѣмана	Nieman
Вислы	Vistula
Днѣстра	Dniester
Днѣпръ съ Южнѣмъ Бугемъ	Dnieper and Southern Bug
Дона	Don
Волги	Volga
Сѣв. Двины	North Drina



